CONSULTANT REPORT

EVALUATION OF THE CLEAN ENERGY WORKFORCE TRAINING PROGRAM

Prepared for: California Energy Commission

Prepared by: DNV KEMA Energy & Sustainability

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ABSTRACT

This report presents the results of the evaluation of the Clean Energy Workforce Training Program administered by the California Energy Commission and funded by the American Recovery and Reinvestment Act of 2009 (ARRA). The Energy Commission designed this program to build capacity for clean energy training in the state by using sector strategies to create a well-planned workforce training effort, establishing standardized training leading to certifications in the clean energy sector, and creating career pathways for the growing clean energy sector. The Energy Commission distributed nearly $19 million of State Energy Program funds to the Clean Energy Workforce Training Program.

Roughly, 4,200 individuals completed training activities funded through the programs administered by the Employment Development Department. Individuals who completed this training obtained more than 3,500 industry-recognized certifications, and nearly 1,900 were placed in jobs upon completing his or her training. Almost 3,200 individuals completed training activities funded through the programs administered by the Employment Training Panel, and all of these individuals held employment positions per the employment retention requirements of this program.

Overall, the results of this evaluation indicate that the specific training activities included within the design of the Clean Energy Workforce Training Program more than adequately took into account the needs of the local labor markets. The use of sector strategies effectively engaged local clean energy workforce advisory groups and potential employers during the planning stages of the program to ensure that the training provided would meet the needs of the local labor market. In addition to meeting industry and employer needs, the program was designed to further individual trainees on their career paths. The use of standardized certifications increased the likelihood of sustained participation of trainees in the clean energy industry.

Keywords: Clean Energy Workforce Training Program; Workforce, Education and Training; sector strategies; certifications; evaluation; ARRA funding

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EXECUTIVE SUMMARY

The California Energy Commission (Energy Commission) designed the Clean Energy Workforce Training Program to leverage California's existing training framework and address anticipated demand for trained workers in the clean energy industry. The Energy Commission distributed nearly $19 million of State Energy Program funds from the American Recovery and Reinvestment Act of 2009 (ARRA) to the program. The objectives of the program were to: close the talent gap for clean energy jobs by building capacity for clean energy training in the state, use sector strategies to create a well-planned workforce training effort through partnerships, establish standardized training leading to certifications in the clean energy sector, and create career pathways for the growing clean energy sector.

The Energy Commission entered into interagency agreements with the Employment Development Department to administer funding to partnerships and with the Employment Training Panel to administer funding to subcontractors to provide services for training. Table 1 presents an overview of the various components included within the Clean Energy Workforce Training Program.

The Energy Commission retained DNV KEMA Energy & Sustainability as evaluators to assess the effectiveness of the Clean Energy Workforce Training Program implementation. Additional goals included assessing its strategic alignment with labor market needs, its alignment with other Energy Commission programs, and the sustainability of training activities beyond the ARRA funding period.

The evaluation approach incorporated several methods to meet the overall objectives, including reviewing information reported by the Energy Commission and the program administrators; completing in-depth interviews with subgrantees, subcontractors, and employers; and conducting telephone surveys with training program participants.

Table 1: Summary of Clean Energy Workforce Training Program Components

	Employment Development Department	Employment Training Panel
ARRA SEP Funds		
Program Implementation Expenditures	$15.37 million[1]	$2.58 million[2]
Administrative Costs	$0.5 million[1]	$0.42 million[2]
Total ARRA SEP Expenditures	**$15.87 million[1]**	**$3.00 million[2]**
Other Funds[3]	$9.7 million[1]	None
Total Clean Energy Workforce Training Program Expenditures	**$25.57 million**	**$3.00 million**
Selection for Awards	Competitive and non-competitive bid	Non-competitive bid
Award Type	28 competitively-bid grant agreements, 4 non-competitively bid grant agreements[4]	13 performance-based contracts
Award Duration	18 months	22-24 months
Target Awardees	Partnerships of community colleges and workforce investment boards	Employers, trade associations, unions, community colleges
Target Trainees	New workforce entrants or unemployed or underemployed	Incumbent workers and new hires

[1] From Employment Development Department's *Final Report for the California Clean Energy Workforce Training Program*, April 13, 2012, available from *http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/CA_Clean_Energy_Wrkfc_Training_Program-Final_Report_2012-04-13.pdf* (accessed 7/28/2013).

[2] From the *Final Report for the Employment Training Panel*, May 11, 2012, available from *http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/Employment_Training_Panel-Final_Report_2012-05-11.pdf* (accessed 7/28/2013).

[3] Funds provided through the Recovery Act, Governor's Discretionary 15 Percent account, as stated in Employment Development Department's *California Clean Energy Workforce Training Program Solicitation for Proposals*, available from: *http://edd.ca.gov/Jobs_and_Training/pubs/wiasfp09-2.pdf.* (Accessed 7/28/2013).

[4] Four noncompetitively bid grant agreements were completed with On-the-Job Training subgrantees.

Source: DNV KEMA

Evaluation Results

Overall, the evaluation results indicate that the Clean Energy Workforce Training Program more than adequately took into account the needs of the local labor markets. Roughly, 4,200 individuals completed training funded through the Employment Development Department Pre-Apprenticeship and Retraining program elements, including more than 3,500 industry-recognized certifications obtained by training participants, and nearly 1,900 placed in jobs upon completing the training activities. Almost 3,200 individuals completed training activities funded through the Employment Training Panel's Career Advancement program element, and all these individuals completed the employment retention requirement.

The following summarizes the key findings from the evaluation:

- **The use of sector strategies effectively engaged local clean energy workforce advisory groups and potential employers during the planning stages of the program to ensure that the training provided would meet the needs of the local labor market.** Sector strategies were essential to developing realistic, localized projections of clean energy labor requirements within a given industry and geographic region, as well as developing and implementing training activities relevant to those requirements.
- **The design and implementation of the Clean Energy Workforce Training Program included efforts to target specific types of workers expected to require training on clean energy industry topics and skills.** In recognition of high rates of unemployment within the construction, mechanical, and electrical trades, training activities were designed to anticipate the need for training and retraining of these types of workers. Unemployed and underemployed workforce segments were specifically targeted, as were incumbent workers identified as requiring new or upgraded clean energy-related skills. Clean Energy Workforce Training Program activities were also designed to target and to address the specific needs of underrepresented groups, such as females, younger workers, less educated workers, veterans, and the chronically unemployed. In this regard, the Clean Energy Workforce Training Program activities were highly aligned with those of other ARRA-funded programs, such as the Municipal and Commercial Building Targeted Retrofit Program.
- **The Clean Energy Workforce Training Program contributed toward building capacity within the clean energy industry workforce by incorporating relevant and appropriate training content.** That is, training curricula and activities were designed to address specific topics and end-use technologies, as well as other employment-related skills consistent with labor market needs. Training participants confirmed in telephone surveys that they received training on a wide range of topics and that these topics were directly related to their current job, providing further evidence of effective design and capacity building. Training activities were designed to address more general topics, including the basic skills needed to obtain and keep a job.
- **Clean Energy Workforce Training Program activities were not only designed and implemented to meet industry and employer needs, they were also successful in furthering trainees on their career paths.** Training participant survey results confirmed that Clean Energy Workforce Training Program training activities offered an entry point and/or supported growth along the participants' chosen career paths. Participants agreed that the training they received motivated them to continue to work in a field related to clean energy, that the training motivated them to consider additional training in clean energy, and that the training created more opportunities for career advancement. Participants also agreed that their careers had advanced or will advance because of the training, further suggesting the value they placed on their training experiences.
- **Participants reported high levels of satisfaction with the training.** Trainees confirmed that they received useful information and had effective instruction. Further, they valued

the supportive services they received which helped reduce barriers to sustained participation.

- **Clean Energy Workforce Training Program activities also provided standardized training that led to more than 3,500 industry-recognized certifications.** Obtaining certifications contributed to the sustained participation of trainees in the clean energy industry and aided training program recruitment, retention, and job placement. In addition, other ARRA-funded programs, such as the Comprehensive California Residential Retrofit Programs, required certifications that were valued in the market and supported through Clean Energy Workforce Training Program initiatives. This alignment across and within programs helped ensure that the knowledge and skills acquired during training would be required in the clean energy workforce, and supportive of participants' desires to have recognized and viable career paths.
- **The Clean Energy Workforce Training Program was also successful in meeting targets with respect to number of people trained and number of jobs placed or retained.** As part of the overarching goal to build capacity within the workforce in the state, the Employment Development Department subgrantees and the Employment Training Panel subcontractors established specific goals in terms of the number of people they intended to train and how many would be placed in new jobs or retain existing jobs after having completed training activities. Overall, program documents indicate that more than 9,200 individuals enrolled in at least one of the Clean Energy Workforce Training Program training activities, which was 116 percent of the enrollment goal. About 7,400 individuals completed at least one of the training activities in which they were enrolled, which was 101 percent of the goal. In terms of job placement and retention, about 1,900 participants in the Employment Development Department Pre-Apprenticeship and Retraining program elements were placed in new jobs after having completed training, and nearly 3,200 participants in the Employment Training Panel Career Advancement program element were retained in employment positions following training program participation.
- **Despite these accomplishments, the demand for workers during the 2009-2011 time frame was lower than expected for a number of reasons.** Respondents cited the economy as a prime reason for the lack of jobs, specifically the construction industry lagging due to the economic downturn. In mid-2011, California's overall unemployment rate was 12 percent statewide[1] in comparison to the national rate of 9 percent.[2] In addition, legislation and key programs – such as, Property Assessed Clean Energy financing and Energy Upgrade California™– were cancelled, delayed in start-up, or did not reach the expected levels of penetration. As a result, businesses were reluctant to

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1 United States Department of Labor, Bureau of Labor Statistics, *Local Area Unemployment Statistics*, available from *http://data.bls.gov/timeseries/LASST06000003* (accessed 9/11/2013).

2 United States Department of Labor, Bureau of Labor Statistics, *Labor Force Statistics from the Current Population Survey*, available from *http://data.bls.gov/timeseries/LNS14000000* (accessed 9/11/2013).

expand, and homeowners lacked confidence to invest in energy efficiency, leading to significantly fewer jobs than anticipated. Finally, uncertainty with regard to regulatory processes and confusion over utility rebate programs led to lower-than-expected installations of both utility-scale and customer-sited clean energy upgrade projects. These combined factors caused reductions in the demand for trained workers as compared to what was anticipated when the Clean Energy Workforce Training Program was designed.

- **The Clean Energy Workforce Training Program was found to be highly effective in terms of its recruitment and retention rates, adaptability, delivery approach, and instructor quality.** The high rates of trainee and employer retention achieved by the program were a result of effective marketing, recruiting, and screening, as well as important supportive services. The program was also effective in adapting and modifying the training and workforce goals as they were reassessed throughout the program period. Partnerships were particularly effective in facilitating an appropriate balance of private and public instruction and leveraging existing infrastructure, while simultaneously allowing for participation from new training partners and organizations. Finally, industry experience of instructors was universally regarded as a critical factor in program effectiveness.
- **Sustainability is often the most challenging goal for new and developing programs, even under the best labor market and economic conditions. The evaluation found evidence that the workforce development functions initiated through the Clean Energy Workforce Training Program should continue beyond the ARRA funding period.** For example, the design of the Clean Energy Workforce Training Program effectively leveraged existing resources and partnerships, and in some cases, led to the formation of new collaborative bonds between educational institutions, industry advisory councils, and local workforce agencies. The Clean Energy Workforce Training Program strengthened these partnerships, which is a critical outcome that should lead to sustaining clean energy training into the future. Additional evidence of sustainability includes the development of training curricula that has now been incorporated within standard training programs in some areas, and the identification of funding sources to sustain clean energy training, such as fee-based models, nonprofit/charitable funding frameworks, public agencies, and educational institutions.

Evaluation Recommendations

Workforce education and training will continue to be a key element of California's Long Term Energy Efficiency Strategic Plan. Created in 2008, California's Long Term Energy Efficiency Strategic Plan identified workforce education and training as essential to the successful implementation of energy efficiency programs so that savings goals are achieved. In recognizing that many other entities in the state are involved in workforce education and training, the California Public Utilities Commission highlighted the need for a collaborative effort among state agencies, educational institutions, community-based and nonprofit organizations, private industry, and labor to create a comprehensive and coordinated statewide

Workforce Education and Training Program for a new, energy-efficient economy. As such, the Energy Commission should continue to participate in statewide, collaborative efforts to support the development of a sustainable and high-quality clean energy training program, building on the successes and lessons learned from the CEWTP experience.

Policy and legislative support for the activities and programs that use these trained workers will also be required to sustain the success of ARRA-funded clean energy workforce education and training activities. Public resources should continue to be allocated in support of clean energy workforce education and training programs, and program implementers should be required to address the extent to which they address workforce education and training needs. Further, publicly funded energy efficiency programs should consider including industry and market recognized clean energy certifications and skill standards as part of their program requirements.

The following summarizes the key recommendations for future programs as determined through this evaluation:

- Future training programs should continue to use the sector strategy approach to ensure program design effectiveness, allocating funding as appropriate to ensure that support from community colleges, workforce investment boards, employers, trade associations, and unions can be made available.
- Future training programs should continue to be designed to address participants' desires to have a career in clean energy.
- In terms of training program format and content, various types of hands-on training should continue to be incorporated into future program designs, as well as maintaining an appropriate balance between theoretical knowledge and practical experience.
- Future training programs should continue to use workforce investment boards and other workforce partners to ensure effective leveraging of established employer networks and job search resources.
- Future programs should continue to seek ways to improve trainee and employer marketing and coordination strategies.
- To maintain trainee recruitment and retention rates, future programs should continue to screen for basic skills, aptitude, and experience.
- Future programs should continue to offer flexible schedules and financial and other supportive services.
- Future programs should continue to balance private and public sector options, provide sufficient time for upfront planning, and ensure instructor quality.
- Future programs should provide improved documentation to enhance evaluability, such as detailed information on the training activities and certifications, trainee characteristics, trainee contact information (or a means of obtaining it where privacy/confidentiality constraints exist), and employer documentation.

CHAPTER 1:
Introduction

This report provides the California Energy Commission with an independent evaluation of the Clean Energy Workforce Training Program (CEWTP).

The primary objectives of the evaluation are to assess the effectiveness of the program in achieving goals, strategic alignment with labor market needs, alignment with other Energy Commission programs, and sustainability of training activities beyond the American Recovery and Reinvestment Act of 2009 (ARRA) funding period.

The evaluation developed and used information from a number of sources, including information and documentation provided by the Energy Commission and the program administrators; in-depth interviews with subgrantees, subcontractors, and employers; and telephone surveys with training program participants.

Most of the primary and secondary data collection for this effort was carried out from August 2011 through March 2012. Additional analysis of program documentation and evaluation results continued through January 2013.

The organization of subsequent sections of this report is as follows:

- **Chapter 2: Program Overview –** Provides a description of CEWTP, its objectives, budget allocations, and target number of training participants.
- **Chapter 3: Evaluation Methodology –** Describes the set of evaluation activities, such as the program documentation review, in-depth interviews with program implementation staff and employers, and telephone interviews with training participants.
- **Chapter 4: Building Capacity and Meeting Needs of California's Labor Market –** Characterizes CEWTP training activities and provides the means for assessing alignment of those activities with the training needs of California's labor market.
- **Chapter 5: Program Accomplishments –** Summarizes program achievements, including number of participants who completed training activities, number of certifications obtained by training participants, and number of jobs placed and/or retained by training participants.
- **Chapter 6: Implementer and Employer Perspectives –** Provides results from in-depth interviews with Employment Development Department (EDD) and Employment Training Panel (ETP) staff, subgrantees and subcontractors, and employers.
- **Chapter 7: Training Participant Survey Results –** Provides results from telephone surveys with training participants.
- **Chapter 8: Conclusions and Recommendations –** Summarizes the evaluation results and recommendations for this type of program going forward.
- **Chapter 9: Glossary –**Lists and describes the meaning of acronyms used in this report.

Appendices to this report include:

- **Appendix A: Partnerships of Training Programs with Stakeholders –** Provides a list of stakeholders involved in partnerships with each EDD subgrantee and ETP subcontractor.
- **Appendix B: Data Collection Instruments –** Includes in-depth interview guides that were used to interview EDD and ETP staff, subgrantees and subcontractors, and employers, and the instrument used for telephone surveys of training participants.
- **Appendix C: CEWTP Trainee Survey Results –** Presents results from the training participant survey.

CHAPTER 2:
Program Overview

On February 17, 2009, President Obama signed the American Recovery and Reinvestment Act, which provided funding to the State Energy Program (SEP). The United States Department of Energy (U.S. DOE) awarded $226 million in SEP funds to the Energy Commission to support energy-related programs that would stimulate the economy, create and retain jobs, and achieve lasting and measurable energy benefits in the state. In developing these programs, the Energy Commission determined there was a strong need for training the workforce with the skills necessary to meet these program goals, and therefore, dedicated $20 million (roughly 10 percent of the total California SEP ARRA funds) to workforce training, through CEWTP.

Background

Several state policies and strategies established the context and the need for training.

- **California Public Utilities Commission's *California Long Term Energy Efficiency Strategic Plan:***[3] This plan provides a roadmap for energy efficiency in California through 2020 and beyond. The plan articulates a long-term vision and goals for each economic sector, such as commercial, industrial, agricultural, and residential, including low-income and disadvantaged communities, and identifies specific strategies for achieving those goals. The plan describes two goals for workforce education and training (WE&T):
  - Establish energy efficiency education and training at all levels of California's educational system.
  - Ensure that minority, low-income, and disadvantaged communities fully participate in training and education programs at all levels of the demand-side management and energy efficiency industry.

  The plan outlines an implementation plan to achieve these goals through the involvement of and coordination between the investor-owned utilities (IOUs), government, educational institutions, community-based and nonprofit organizations, and industry and labor organizations.

3 California Public Utilities Commission, *California Long Term Energy Efficiency Strategic Plan, January 2011 Update* is available from http://www.cpuc.ca.gov/NR/rdonlyres/A54B59C2-D571-440D-9477-3363726F573A/0/CAEnergyEfficiencyStrategicPlan_Jan2011.pdf (accessed 9/11/2013).

- ***Integrated Energy Policy Report*[4] (*IEPR*):** This report provides an update to the Legislature on trends and issues concerning electricity and natural gas, transportation, energy efficiency, renewables, and public interest energy research. The *2009 IEPR* acknowledges the economic downturn, but the extent of its effect on implementing some of the strategic goals was unknown at the time. The 2009 report anticipates ARRA-funded programs will supplement the training and workforce development efforts related to energy efficiency and the transportation sector that were already underway across the state, but detailed plans were not yet available.

Additional state standards and goals drive the clean energy economy and helped shape the focus of CEWTP:

- **The *AB 32 Draft Scoping Plan:***[5] This plan outlines the framework for meeting the requirements of the Global Warming Solutions Act of 2006 (Assembly Bill 32, Núñez, Chapter 488, Statutes of 2006), which set a goal of reducing greenhouse gas emissions to 1990 levels by 2020.
- **California's *Green Building Action Plan*:**[6] This plan establishes a goal for public buildings to be 20 percent more energy-efficient by 2015.
- **Renewables Portfolio Standard:**[7] This standard requires a certain percentage of procurement to be from eligible renewable energy resources.
- **Go Solar California:**[8] This is a statewide effort to support on-site solar installations. This effort establishes a goal of installing 3,000 megawatts of solar energy systems on new and existing residential and commercial sites and placing solar energy systems on 50 percent of new homes by 2020.

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4 California Energy Commission, *2009 Integrated Energy Policy Report*, Final Commission Report, December 2009, CEC-100-2009-003-CMF, is available from http://www.energy.ca.gov/2009publications/CEC-100-2009-003/CEC-100-2009-003-CMF.PDF (accessed 7/28/2013).

5 A report from California Air Resources Board. *Climate Change Scoping Plan: A Framework for Change. Pursuant to AB32 the California Global Warming Solutions Act of 2006,* December 2008, available from http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm (accessed 7/28/2013).

6 *State of California, Green Building Action Plan (Detailed direction that accompanies Governor's Executive Order S-20-04)* is available from http://www.documents.dgs.ca.gov/green/GreenBuildingActionPlan.pdf (accessed 7/28/2013).

7 California Renewables Portfolio Standards information is available from http://www.cpuc.ca.gov/PUC/energy/Renewables/ (accessed 7/28/2013).

8 Go Solar California information available from http://www.gosolarcalifornia.org/about/gosolar/legislation.php (accessed 7/28/2013).

The Energy Commission also reviewed other sources[9] to inform program design:

- Labor market data from EDD,[10] which was also in the early stages of conducting a statewide green jobs survey to better understand the nature of the green economy, the number of green jobs, and the effect of policies on the growth of industries in the state
- Regional workforce data provided by the Community Colleges' Centers for Excellence[11]
- Pew Charitable Trusts' 2009 report *The Clean Energy Economy*,[12] which indicates that California's public policies, such as energy efficiency and renewable portfolio standards, were the foundation the largest clean energy economy in the United States and suggests that there should be a large number of jobs
- Studies by the Cleantech Group,[13] which provide a breakdown of venture capital investments in the clean energy economy, indicating which segments were the fastest growing and, therefore, had the most demand for skilled workers.

Program Objectives

The Energy Commission designed the CEWTP to leverage and advance the structure of California's existing training framework to address anticipated demand for trained workers in the clean energy industry. As such, the primary objectives of the program were to:

1. **Close the talent gap for the projected clean energy jobs by building capacity for clean energy training in the state.** While the *2009 IEPR* describes general funding plans, the *2010 IEPR Update*[14] outlines the structure and strategy of the ARRA-funded programs and their anticipated impacts on the state's clean energy economy. One of the highest priorities of the Energy Commission's ARRA-funded awards was to stimulate the economy and create or retain jobs in California. The *2010 IEPR Update* reports that the

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9 The Energy Commission provided a description of sources to evaluators in March 2012.

10 Labor market information for California is available through EDD from http://www.labormarketinfo.edd.ca.gov/ (accessed 7/28/2013).

11 California Community Colleges Center of Excellence information is available from http://www.coeccc.net/about_overview.asp (accessed 7/28/2013).

12 A report from The Pew Charitable Trusts, *The Clean Energy Economy, Repowering Jobs, Businesses and Investments Across America*, June 2009, is available from http://www.pewtrusts.org/our_work_report_detail.aspx?id=53260 (accessed 7/28/2013).

13 *Cleantech Investment – 2008 Annual Review* is no longer available at *www.cleantech.com.* The oldest report available on their website is from 2010 *http://www.cleantech.com/wp-content/uploads/2013/02/2010-Global-Cleantech-100-Report-FINAL.pdf* (accessed 9/11/2013).

14 *California Energy Commission, 2011. 2010 Integrated Energy Policy Report Update.* Publication Number: CEC-100-2010-001-CMF, is available from http://www.energy.ca.gov/2010publications/CEC-100-2010-001/CEC-100-2010-001-CMF.PDF (accessed 7/28/2013).

Energy Commission decided to allocate a large proportion of ARRA funds to energy efficiency efforts to maximize the cost-effectiveness of creating jobs in the energy industry. The *2010 IEPR Update* projects ARRA-funded programs would create demand for:

- Contractors (heating, ventilation, and air-conditioning (HVAC), insulation, roofing, solar, and building performance).
- Technicians and laborers who work for contractors.
- Lighting equipment/control and HVAC control installers.
- Home energy raters , energy auditors, and retrocommissioning[15] agents
- Manufacturing jobs for production of energy-related materials such as insulation, efficient windows, efficient HVAC and water heating equipment, lighting equipment, and reflective roofing known as "cool" roofing.
- Support staff at local government, technical consulting firms, and financing providers.

The Energy Commission designed CEWTP to address the training needs for the first four categories. Subgrantees and subcontractors selected curricula that would ensure workers could obtain the skills to fill jobs in these areas.

2. **Use sector strategies to create well-planned workforce training efforts through partnerships.** The Energy Commission sought to foster sector strategies by creating local partnerships of workforce investment boards (WIBs), community colleges, businesses, labor organizations, and community-based organizations. These partnerships were essential in developing training that met the needs of local businesses and required workforce, education, and economic partners to share a stake in the endeavor.
3. **Establish standardized training leading to certifications in the clean energy sector.** The program required the delivery of standardized training allowing trainees to obtain certifications to ensure a high level of quality and consistency across all programs. For example, solar photovoltaic (PV) installation training was certified by the North American Board of Certified Energy Practitioners (NABCEP), a national certifying body recognized by industry.
4. **Create career pathways for the growing clean energy sector.** The program was designed to prepare trainees to enter a higher level of training or education, such as postsecondary education, an apprenticeship program, or employment. Those requiring additional skills training, such as math or English, were expected to meet additional benchmarks, such as completing the General Educational Development (GED) test. These goals were established with the expectation that the programs were creating viable, high-wage career pathways for the participants.

15 Retrocommissioning is optimizing the existing building systems and operations to improve energy performance.

Program Implementation

Building upon the existing infrastructure in the state for workforce development, the Energy Commission identified EDD and ETP as being in the best position to facilitate CEWTP implementation. EDD is a large state department that administers programs for Californians that include Workforce Services, unemployment insurance, disability insurance, and labor market information.[16] ETP is a much smaller state agency that supports employers in bolstering their competitiveness in the global economy by funding customized job skills training.

The Energy Commission entered into interagency agreements with EDD to administer funding to subgrantees and with ETP to administer funding to subcontractors to provide services for training. Initially $20 million from ARRA funds was allocated to CEWTP, with $14.5 million assigned to subgrants administered by EDD and $4.5 million to subcontracts administered by ETP, with up to $0.5 million budgeted to each agency for administering the program. [17] In addition to ARRA funding, the subgrants under the EDD interagency agreement were supplemented with federal Workforce Investment Act (WIA) Governor's Discretionary 15 percent funds.[18]

During the interagency agreements, the Energy Commission decided to redirect some of ETP's unspent CEWTP funds to maximize use of ARRA funds, reducing the total ETP CEWTP budget for training expenditures and ETP administrative costs to $3,472,548.[19] The Energy Commission redirected an additional $1,018,574 of unspent ARRA funds to EDD, increasing the total EDD CEWTP budget for subgrants and EDD program administrative fees to $16,018,575.[20]

Employment Development Department (EDD)

EDD released a solicitation for proposals[21] (SFP) and initially awarded 28 subgrants[22] to the highest scoring local partnerships in October 2009 to offer training for 18 months. EDD

16 EDD also collects payroll taxes and maintains employment records.

17 These figures represent the original allocations from the budget detail in the interagency agreements. Final expenditures are presented and discussed in subsequent sections of this report.

18 *WIA of 1998, Public Law 105-220--Aug. 7, 1998, 112 Stat. 936, 105th Congress*. Available from *http://www.doleta.gov/usworkforce/wia/wialaw.txt* (accessed 7/28/2013).

19 From the *Final Report for the Employment Training Panel*, May 11, 2012, available from *http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/Employment_Training_Panel-Final_Report_2012-05-11.pdf* (accessed 7/28/2013).

20 From EDD's *Final Report for the California Clean Energy Workforce Training Program*, April 13, 2012, available from *http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/CA_Clean_Energy_Wrkfc_Training_Program-Final_Report_2012-04-13.pdf* (accessed 7/28/2013).

21 EDD's *California Clean Energy Workforce Training Program Solicitation for Proposals*, available from *http://edd.ca.gov/Jobs_and_Training/pubs/wiasfp09-2.pdf* (accessed 7/28/2013).

managed the subgrants and negotiated subgrantee agreements with partnerships of community colleges and WIBs to train unemployed and underemployed individuals and new workforce entrants. Since construction was the sector hit hardest by the economic downturn, a primary focus was on unemployed and underemployed construction workers, although all individuals meeting the WIA eligibility requirements[23] were allowed to participate.

Each subgrantee specified performance goals as part of the proposal for CEWTP funding. The goals became part of the subgrantee agreements and included metrics such as the number of participants enrolling in training, completing training, attaining recognized certificates, being placed in unsubsidized employment, being placed in training-related jobs, and retaining employment six months posttraining. Subgrantees reported progress monthly to EDD. As required by the WIA funding, subgrantees submitted closeout reports that included the CEWTP accomplishments at the completion of the subgrant period.

EDD regional advisors managed the grants by providing technical assistance and ensuring that grantees operated their projects consistent with the objectives and deliverables detailed in their grant documents. EDD regional advisors also responded to subgrantee questions regarding training, visited the training sites, and collected required reports, including closeout reports at the end of the subgrant term. Most of these programs ended in June 2011; however, as the end of the grant period approached, the Energy Commission redirected some unspent ARRA funds to four high-performing EDD subgrantees to implement additional training through February 2012, increasing the total number to 32 subgrants awarded. EDD paid the 24 subgrantees a total of $15,372,849 for the 32 subgrants and the Energy Commission paid EDD $500,000 for administrative fees.[24]

Employment Training Panel (ETP)

ETP posted guidelines on their website to give potential CEWTP applicants an indication as to the types of projects that would qualify for these monies, and provided examples of specific types of curriculum that both the Energy Commission and ETP were seeking. ETP projects required a training component and a posttraining employment retention period.[25] The standard core program retention required trainees to be placed and retained in full-time employment for 90 consecutive days with one employer. Another option, available at the preapprentice or journey level, accommodated an alternative work pattern by having retention set at 200 hours within a period of 365 days, without the restriction of working for only one employer. ETP staff

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22 Four of the original subgrantees were awarded two grant agreements.

23 Workforce Investment Act (WIA) may be found at *http://www.edd.ca.gov/jobs_and_Training/Workforce_Investment_Act.htm* (accessed 9/11/2013).

24 From EDD's *Final Report for the California Clean Energy Workforce Training Program*, April 13, 2012, available from *http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/CA_Clean_Energy_Wrkfc_Training_Program-Final_Report_2012-04-13.pdf* (accessed 7/28/2013).

25 Provided by ETP staff to evaluators in July 2013.

worked with potential subcontractors to develop proposals for funding and to negotiate the subcontracts. ETP provided technical assistance in the design and development of training curriculum to meet the specific needs of the subcontractor, and contracted directly with local businesses, trade organizations, unions, and community colleges, which trained current workers or newly hired employees in clean energy practices.

As part of the agreement with ETP, each subcontractor estimated the number of training participants and specified the funding required for training costs, based on established fixed-fee hourly rates.[26] Subcontractors reported the number of hours of training completed and retention achieved. Compensation for ETP subcontractors was paid in three increments based on various performance criteria. The first payment, up to 25 percent of the average cost per trainee, was payable upon enrollment and completion of the first eight hours of training. The second payment was payable after completion of all training hours. Payments one and two combined were about 75 percent of the actual cost per trainee within the range of allowable training hours. The third and final payment covered the balance of the unpaid training cost, which was paid for each trainee after completion of both the training and the required posttraining retention period.[27]

ETP regional analysts managed the subcontracts by ensuring that subcontractors provided training per the terms of the agreement and properly allocated money and reported program activity per ETP and ARRA requirements. Regional analysts provided technical assistance, responded to subcontractor questions regarding training, visited the training site, and provided a final visit report at the end of the contract term.

ETP executed 14 training contracts that began in 2010; however, only 13 were completed by the end of 2011. Solyndra was initially awarded an ETP subcontract but, once the ETP Fiscal Unit received the notice of bankruptcy, its subcontract was terminated, and the funds were disencumbered.[28] No payments were made to Solyndra. ETP paid the 13 subcontractors a total of $2,578,937, and the Energy Commission paid ETP $424,721 for administrative costs.

Table 2 provides an overview of the interagency agreements executed for CEWTP. Figure 1 and Figure 2 present the locations of EDD and ETP subrecipients in Northern and Southern California, respectively.

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26 Rate schedule is contained in ETP's *Contractor's Guide*, January 2010, available from http://www.etp.ca.gov/pubs_cont_guides.cfm (accessed 7/28/2013).

27 Provided by ETP staff to evaluators in July 2013.

28 From the *Final Report for the Employment Training Panel*, May 11, 2012, available from http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/Employment_Training_Panel-Final_Report_2012-05-11.pdf (accessed 7/28/2013).

Table 2: Summary of Clean Energy Workforce Training Program Interagency Agreements

	Employment Development Department	Employment Training Panel
ARRA SEP Funds		
Program Implementation Expenditures	$15.37 million[1]	$2.58 million[2]
Administrative Costs	$0.5 million[1]	$0.42 million[2]
Total ARRA SEP Expenditures	**$15.87 million[1]**	**$3.00 million[2]**
Other Funds[3]	$9.7 million[1]	None
Total CEWTP Expenditures	**$25.57 million**	**$3.00 million**
Selection for Awards	Competitive and non-competitive bid	Non-competitive bid
Award Type	28 competitively-bid grant agreements, 4 non-competitively bid grant agreements[4]	13 performance-based contracts
Award Duration	18 months	22-24 months
Target Awardees	Partnerships of community colleges and workforce investment boards	Employers, trade associations, unions, community colleges
Target Trainees	New workforce entrants or unemployed or underemployed	Incumbent workers and new hires

[1] From Employment Development Department's *Final Report for the California Clean Energy Workforce Training Program*, April 13, 2012, available from *http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/CA_Clean_Energy_Wrkfc_Training_Program-Final_Report_2012-04-13.pdf* (accessed 7/28/2013).

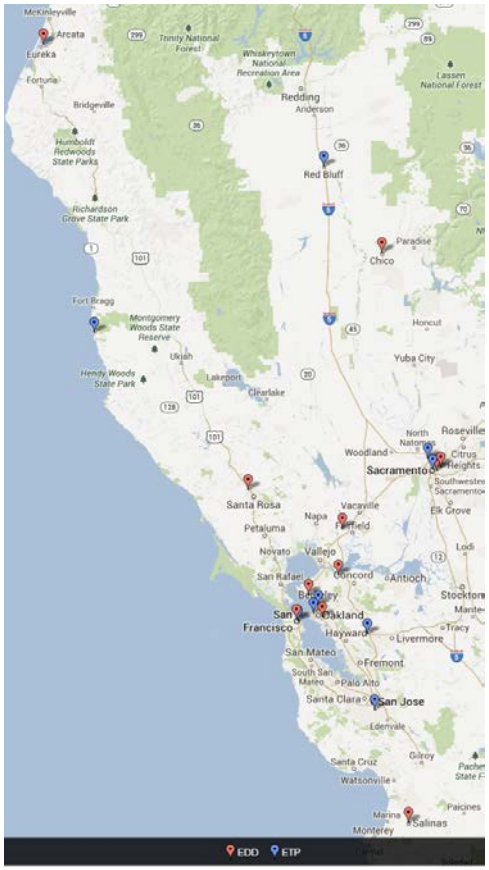
[2] From the *Final Report for the Employment Training Panel*, May 11, 2012, available from *http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/Employment_Training_Panel-Final_Report_2012-05-11.pdf* (accessed 7/28/2013).

[3] Funds provided through the Recovery Act, Governor's Discretionary 15 Percent account, as stated in Employment Development Department's *California Clean Energy Workforce Training Program Solicitation for Proposals*, available from: *http://edd.ca.gov/Jobs_and_Training/pubs/wiasfp09-2.pdf* (accessed 7/28/2013).

[4] Four noncompetitively bid grant agreements were completed with On-the-Job Training subgrantees.

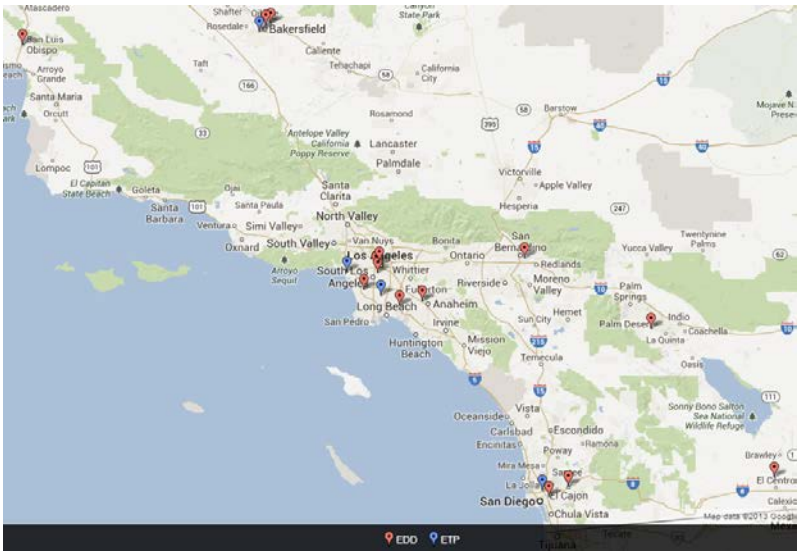
Source: DNV KEMA

Figure 1: Location of EDD and ETP Subrecipients in Northern California



Source: DNV KEMA

Figure 2: Location of EDD and ETP Subrecipients in Southern California



Source: DNV KEMA

Program Elements

With unemployment in California reaching 12.2 percent[29] in 2009, the highest level in the 70 years prior, providing training that would enable these workers to get back into the workforce using skills demanded by the clean energy industry was a priority. The Energy Commission developed three program elements, spanning the green building and clean energy industry sectors. The Energy Commission, in partnership with EDD and ETP, designed these programs to target specific types of workers and provide them with skills in energy efficiency, water efficiency, and renewable energy. The three program elements are summarized as follows:

- **Green Building and Clean Energy Pre-Apprenticeship Partnerships (EDD Pre-Apprenticeship)** were designed to give new workforce entrants, unemployed, or underemployed workers, with little or no construction experience, the job skills and workforce-entry skills necessary to enter an apprenticeship program. EDD Pre-Apprenticeship subgrantees were required to provide additional training, if applicable, based on the participant's assessment results in math, reading, writing, vocational English as a Second Language, and "soft" job skills training such as verbal communication, accountability, ethics, performance, and professionalism. The training prepared participants for jobs in the building retrofit or renewable energy field. EDD's SFP contains a comprehensive list of requirements for the Pre-Apprenticeship subgrantees.[30] The EDD Pre-Apprenticeship program element comprised 18 of the initial 28 EDD subgrants, with subgrantees expecting to train about 2,500 people.
- **Green Building and Clean Energy Retraining Partnerships (EDD Retraining)** targeted unemployed or underemployed workers with construction experience, building on existing construction skills to prepare trainees for employment in the green building or clean energy sectors. EDD's SFP contains a comprehensive list of requirements for the Retraining subgrantees.[30] The EDD Retraining program element comprised 10 of the 28 EDD subgrants and subgrantees expected to train roughly 1,500 people.
- **On-the-Job Training (EDD OJT)** provided participants the opportunity to increase their job skills and add practical work experience. EDD OJT comprised four additional subgrants that were awarded near the end of the contract period.
- **Green Building and Clean Energy Career Advancement (ETP Career Advancement)** was designed to be specific to the needs of participating subcontractors. The ETP Career Advancement program element focused primarily on adding "tools to the toolboxes" of

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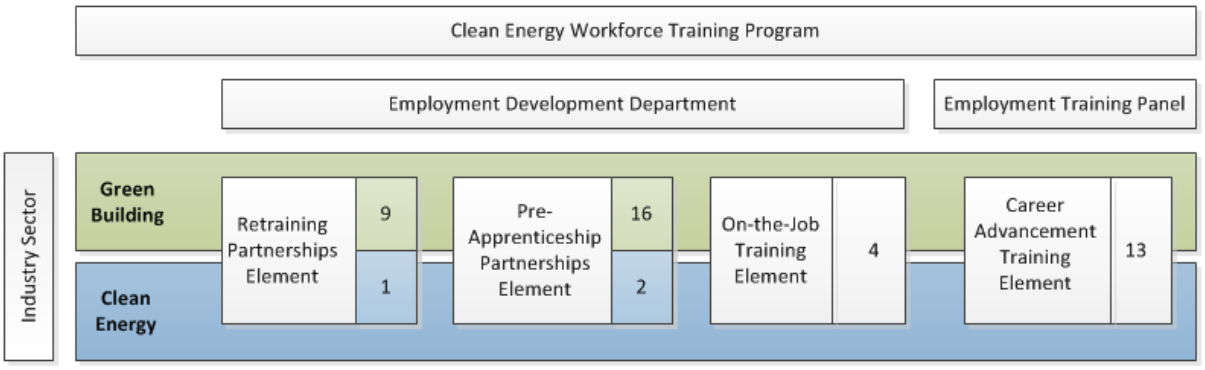
29 United States Department of Labor, Bureau of Labor Statistics, *Local Area Unemployment Statistics*, available from *http://data.bls.gov/timeseries/LASST06000003* (accessed 9/11/2013).

30 EDD's *California Clean Energy Workforce Training Program Solicitation for Proposals*, available from *http://edd.ca.gov/Jobs_and_Training/pubs/wiasfp09-2.pdf* (accessed 7/28/2013).

incumbent workers or new hires to make them – and therefore their employers – more competitive in the marketplace. Participating ETP subcontractors were responsible for identifying training needs, providing employment assurances for trainees, and sometimes providing the training in-house. Participating trainees were existing employees (incumbent workers), new hires/unemployed workers, or workers affiliated with the subcontracting organization. The ETP Career Advancement program element covered a variety of topics with an emphasis on analysis and design, inspections, and audits. The training prepared participants for jobs in the building trades and in the production or transmission of renewable energy. ETP's Contractor Guide describes the types of training eligible for funding.[31] Thirteen subcontracts were awarded to organizations through the ETP Career Advancement program element, with a goal of training 3,255 individuals.

Figure 3 provides an overview of CEWTP and the various EDD and ETP program elements, with numbers representing the number of subgrantees and subcontractors receiving funding in each category. EDD Pre-Apprenticeship and Retraining program elements were designated to a specific industry sector, either green building or clean energy. ETP established specific requirements for subcontractors implementing training within these sectors, as described below.

Figure 3: Overview of Program Elements by Industry Sector and Number of Agreements



* The numbers in the boxes represent the number of agreements for each element.

Source: DNV KEMA

31 ETP's *Contractor's Guide*, January 2010, available from *http://www.etp.ca.gov/pubs_cont_guides.cfm* (accessed 7/28/2013).

Green Building Industry Sector

The Green Building Pre-Apprenticeship and Retraining program elements generally emphasized audits, analysis, installation, and maintenance of major building systems.

Green Building EDD Pre-Apprenticeship Partnerships

Sixteen of the EDD subgrantees offered training through the Green Building Pre-Apprenticeship program element. EDD required Green Building Pre-Apprenticeship subgrantees to provide classroom and hands-on skill training in all of the following areas:

- Environmental literacy training
- Introduction to green building, including sustainable sites, energy conservation, water conservation, resource conservation, and indoor air quality
- Energy fundamentals, including construction technologies and methods, basic energy concepts and information, tool usage, and renewable energy
- Retrofits and energy efficiency, including basic weatherization, appliance troubleshooting, duct testing and sealing, and lighting
- Water efficiency, including water efficiency and conservation measures, landscaping, storm water runoff pollution and prevention, and solar hot water installation and design
- Solar electricity, including installation and design principles

Green Building Retraining Partnerships

Nine EDD subgrantees offered training through the Green Building Retraining program element. EDD required all Green Building Retraining subgrantees to provide three categories of training: green building principles, building science fundamentals and State energy code licensure laws for either the commercial or residential construction sector. EDD prioritized code training by requiring subgrantees to offer training on compliance with the State Energy Efficiency Standards as the foundation of their programs. Code training covered all of the following topics:

- Overview of Title 24 (State Energy Efficiency Standards) and its main requirements
- Lighting design
- Quality control practices and procedures
- Quality insulation installation benefits and credits
- Common insulation installation problems
- Understanding duct installation and diagnostic testing
- Field verification opportunities, benefits, and requirements
- Updates from the 2008 code changes
- Utility and other marketing programs
- Three-year code cycle changes

In addition to the code training, Green Building Retraining subgrantees were required to offer Certified Green Building Professional training. EDD also put an emphasis on certifications by

requiring subgrantees to provide at least four additional technical trainings leading to industry-identified certifications. Certification examples include:

- Residential Certificates:
  - Certified Green Building Professional (Required)
  - Building Analyst Professional
  - Envelope Professional
  - Home Energy Rater
  - Building Performance Contractor
- Commercial Certificates:
  - Sustainable Development Professional
  - Certified Commissioning Professional
- Non-Building Type Specific Certificates
  - Certified PV Installer
  - Water/Energy Auditor
  - Certified Solar Hot Water Installer
  - Accredited Green Plumber
  - HVAC Contractors

Although the Green Building Retraining subgrantees were required to offer multiple technical trainings that led to certifications, the trainees decided the number of certifications they wished to pursue.

Clean Energy Industry Sector

Three EDD subgrantees implemented programs in the clean energy industry sector. One subgrantee implemented a program in the Retraining program element and the other two implemented programs in the Pre-Apprenticeship program element, with all focused on skills related to installation of utility-scale renewable energy systems. EDD required Clean Energy Pre-Apprentice and Retraining subgrantees to provide classroom and hands-on training related to any or all of the following technologies:

- Geothermal
- Wind
- Biomass
- Solar PV
- Solar thermal
- Hydroelectric
- Transmission and distribution infrastructure
- Smart grid design and infrastructure

One additional EDD requirement was applicable to only the Clean Energy Pre-Apprenticeship subgrantees. These two subgrantees were required to be affiliated with a public or investor-owned utility company or certify that the training would be delivered through an established

apprenticeship program. Two options were given. The first was an apprenticeship program that has been approved by California's Department of Industrial Relations, Division of Apprenticeship Standards, and that qualifies participants to take the certification examination under *Labor Code Section 3099.2(d)* prior to graduation. The second was a curriculum of classroom instruction that has been approved under *Labor Code Section 3099.4*, or for which such approval is pending. [32]

32 EDD's *California Clean Energy Workforce Training Program Solicitation for Proposals*, available from *http://edd.ca.gov/Jobs_and_Training/pubs/wiasfp09-2.pdf* (accessed 7/28/2013).

CHAPTER 3:
Evaluation Methodology

This chapter discusses the set of evaluation methods used in the CEWTP evaluation. The evaluation activities were developed in accordance with the description in the evaluation plan. The evaluation activities included:

- Program documentation review.
- In-depth interviews with a sample of program implementation staff and employers.
- Telephone surveys with a sample of training program participants.

Program Documentation Review

The evaluation involved review of program documents, including background information and reported data, to estimate the CEWTP accomplishments, such as number of people trained, number of certifications attained, and employment placements.

Evaluators issued requests in April 2011 to the Energy Commission, EDD, and ETP for program documentation, such as interagency agreements and contracts with the subgrantees and subcontractors. Throughout the rest of 2011 and through the first quarter of 2012, requests for additional program documentation were made through e-mail or by phone.

Table 3 summarizes the types of data requested and obtained for the program elements.

Table 3: Summary of Program Documentation

Documentation Time Frame	EDD	ETP
Pre-Program	Contract between the Energy Commission and the U.S. DOE	
Contractual Documents	• Interagency Agreement with the Energy Commission • Solicitation for Proposal[1] • Proposals from subgrantees • Scoring criteria • Award Summaries • Agreements with subgrantees	• Interagency Agreement with the Energy Commission • Proposals from subcontractors • Contractor's Guide[2] • Agreements with subcontractors
Implementation Tracking	• Summaries of Monthly Status Reports • Annual Report • WIA Job Training Automation System (JTA)	• Invoice summary • Annual Report • ETP Enrollment Database Extract

Documentation Time Frame	EDD	ETP
Post-Program Reporting	• WIA Close-out Reports • EDD Final Report[3]	• Final Monitoring Visit Reports • ETP Final Report[4] • Final Determination for Invoices

[1] EDD's *California Clean Energy Workforce Training Program Solicitation for Proposals*, available from *http://edd.ca.gov/Jobs_and_Training/pubs/wiasfp09-2.pdf* (accessed 7/28/2013).

[2] ETP's *Contractor's Guide*, January 2010, available from http://www.etp.ca.gov/pubs_cont_guides.cfm (accessed 7/28/2013).

[3] EDD's *Final Report for the California Clean Energy Workforce Training Program*, April 13, 2012, available from *http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/CA_Clean_Energy_Wrkfc_Training_Program-Final_Report_2012-04-13.pdf* (accessed 7/28/2013).

[4] *Final Report for the Employment Training Panel*, May 11, 2012, available from http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/Employment_Training_Panel-Final_Report_2012-05-11.pdf (accessed 7/28/2013).

Source: DNV KEMA

The key program documents that the evaluation team used for the CEWTP evaluation were:

- **EDD and ETP contractual documents –** These documents provided high-level information related to the CEWTP objectives and program elements. The documents provided key data for the 28 EDD subgrantees and 13 ETP subcontractors, including initial goal numbers of enrollees, completions, certifications, and job placements; proposed training curriculum; and the demographic characteristics of the target trainee populations.
- **EDD WIA –** All EDD subgrantees were required to submit detailed data into the JTA about participating trainees, including gender, age, race and ethnicity, veteran status, employment status, employment history, and special needs requirements. The JTA submissions also included data related to the employment services that were provided, the number of CEWTP enrollments, training completions, whether the trainees were employed upon exit from the training, and whether that employment was related to the CEWTP training. EDD provided JTA extracts for all of the 28 subgrantees.
- **ETP enrollment database –** These data included trainee and employer contact information, along with demographic data on enrolled trainees. They were used to develop trainee survey samples (discussed below).
- **EDD WIA closeout reports –** EDD provided final WIA closeout reports for all of the 28 EDD subgrantees. These reports were completed by the subgrantees themselves and contained many insights and rich discussion pertaining to design and implementation challenges. The WIA closeout reports also contained data from some EDD subgrantees comparing their actual (reported) trainee enrollments, completions, certifications, and job placement to the targets contained in their contractual agreements.
- **ETP final monitoring reports –** ETP submitted final monitoring reports for all the 14 original ETP subcontractors. These reports provide a summary of data subcontractors

entered into the system, along with findings from the monitors' final visit with the subcontractor. Most of these reports included the number of trainees enrolled, the training completions, and the completions of the required employment retention period. The reports also contained some discussion of implementation challenges faced by the contractors and identified any discrepancies in progress reporting. The data in these reports were subject to changes based on final closeout invoices.

- **ETP final determination for invoices** – The ETP Fiscal Unit determined, upon reconciliation of the entire contract, the number of trainees who met retention and the final amount due to the subcontractors.
- **EDD and ETP final reports** —Both EDD and ETP were required to submit a final report for the California CEWTP to the Energy Commission that summarized the implementation of the program and program accomplishments. The report contained a description of the program, performance goals and achievements and challenges or barriers the subgrantees or subcontractors encountered, and the overall budget expenditures.
  - The EDD report[33] also included a description of participant services, summary demographics of participants, and a brief summary for each subgrantee.
  - The ETP report[34] included a description of program modifications.

The evaluators reviewed the program documentation and used the content to characterize the training activities, to assess the accomplishments of the program as compared to the initial goals, and to inform the assessment of alignment with labor market needs.

In-Depth Interviews

The CEWTP evaluation relied heavily on primary data collected through in-depth interviews with key program players, including program administrators, subgrantees, subcontractors, monitoring staff (regional analysts and regional advisors), and employers who have hired a CEWTP trainee. Evaluators developed interview guides specific to the categories of respondents, which are included in Appendix B. Table 4 summarizes the number of interviews completed for each category of respondent.

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33 EDD's *Final Report for the California Clean Energy Workforce Training Program*, April 13, 2012, available from *http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/CA_Clean_Energy_Wrkfc_Training_Program-Final_Report_2012-04-13.pdf* (accessed 7/28/2013).

34 *Final Report for the Employment Training Panel*, May 11, 2012, available from http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/Employment_Training_Panel-Final_Report_2012-05-11.pdf (accessed 7/28/2013).

Table 4: Summary of In-Depth Interviews Completed

Program Elements	Respondent Type	Completed
EDD Pre-Apprenticeship and Retraining	Program Administrator	1
	Regional Advisor	6
	Subgrantee	10
	Employer	5
	Total	**22**
ETP Career Advancement	Program Administrator	1
	Regional Analyst	3
	Subcontractor	6
	Total	**10**

Source: DNV KEMA

The insights and observations gained from these interviews provided much of the material that contributed to findings regarding program design and implementation. This section describes the method for the various in-depth interviews that were completed.

Interviews with Program Administrators

Evaluators interviewed program administrators from EDD and ETP in November 2010 while developing the evaluation research plan. The interviews covered program design, allocation of funding to recipients, and monitoring program activities. The interview with the EDD administrator also included questions about the solicitation for proposals and scoring rubrics, reporting requirements of the subgrantees, and how progress was monitored. The interview with the ETP administrator included probes about how their staff worked with potential applicants to develop a proposal and negotiate a contract, and about the structure of the payment schedule for the performance-based contracts. The information obtained from these interviews helped the evaluators to develop the additional interview guides and the survey for training participants. Evaluators contacted the program administrators throughout the evaluation to request additional information.

Interviews with Monitoring Staff

EDD regional advisors and ETP regional analysts performed some of the administrative duties required by the government agencies that bestowed grants and awards.

Evaluators designed the interview guides for monitoring staff to gather information on overall program design and administration. The interview guides encouraged EDD advisors and ETP analysts to comment on curriculum development and to assess the alignment of the training programs with the needs of their local labor market. Regional analysts and advisors were also

asked to provide their perspective on aspects of the program that have been effective and what challenges subrecipients have faced. The complete interview guides appear in the Appendix B.

EDD had assigned 10 analysts to monitor subgrantees in the regions across the state. Evaluators selected a sample of six advisors from the various regions to be interviewed to ensure statewide coverage. ETP assigned nine ETP regional analysts to monitor the subcontractors statewide, and evaluators interviewed three analysts. Evaluators completed the interviews from November 2011 through January 2012. Information gathered from these interviews informed the evaluation from an administrative perspective, and results are included in Chapter 6 of this report.

Interviews with Subgrantees and Subcontractors

EDD subgrantees and ETP subcontractors (the program implementers) were responsible for administering the clean energy training for which a grant or award was received.

Evaluators designed the interview guides to gather information regarding the design and implementation of the specific training programs. The interview guides asked program staff to discuss collaborative efforts to design training and how various elements of training aligned with local workforce needs. The interviews elicited descriptions of projecting employment opportunities, employer outreach and job placement, and training characteristics, such as certifications, hands-on training, and basic/ancillary skills. Implementers were also encouraged to describe the challenges of program administration and to assess the sustainability of local clean energy training programs in the future. The ETP and EDD guides were similar but differ in a few nuances pertaining to each program. For example, because ETP subcontractors communicate directly with employers, the ETP guide had employer-related questions that did not appear in the EDD subgrantee guide. The complete interview guides appear in Appendix B.

Evaluators selected a sample of EDD Retraining and Pre-Apprenticeship subgrantees and ETP Career Advancement subcontractors to be interviewed. Evaluators considered three stratification dimensions when selecting the sample:

1. The percentage of goal attained for trainees enrolled
2. The contract dollars per expected trainee
3. The number of expected trainees

For the two EDD and one ETP program elements, evaluators selected one implementer from the lower 50 percentile and one from the upper 50 percentile of each stratification dimension. Evaluators gave special consideration to selecting a sample that covered a variety of implementers and included community colleges, workforce agencies, and trade associations. This process resulted in six selections from each of the three program elements, with two of the sampled implementers having participated in both the Pre-Apprentice and Retraining program elements. A total of 10 unique EDD subgrantees and 6 ETP subcontractors were selected and interviewed from November 2011 through January 2012. Table 5 summarizes the number of interviews completed by program element.

Table 5: Summary of Interviews Completed with EDD Subgrantees and ETP Subcontractors

Program Element	Population	Number Interviewed
EDD Pre-Apprenticeship	18	6[1]
EDD Retraining	10	6[1]
ETP Career Advancement	13	6
Total	41	16

[1] Two EDD interviewees had both Retraining and Pre-apprenticeship program elements.

Source: DNV KEMA

Although not all the program implementers were interviewed, the information collected from these interviews informed the evaluation and provided insights from the implementation perspective. Results are presented in Chapter 6 of this report.

Interviews with Employers

Employers are a key factor in determining program success because they provide insightful observations and evaluations of employees hired from the CEWTP training program. One goal of the employer interview guide was to determine what skills employers looked for in a potential employee, and whether these skills had been demonstrated in their experiences with employees hired from CEWTP. The interview also asked employers to comment on the value of various elements of training, such as certifications, hands-on training, and basic/ancillary skills, and to assess the effects of training in terms of increased wages and career potential. The complete employer interview guide appears in Appendix B.

Seven of 24 EDD subgrantees provided employer contact information in response to the request from evaluators.[35] The evaluation team identified five categories of industries represented by the employers and selected one employer from each category to interview. The five industry areas were construction, energy auditing, green technologies, utility-scale solar, and weatherization. The energy-auditing employer was affiliated with the EDD Retraining program element, with the remaining four employers affiliated with the EDD Pre-Apprenticeship program element. Evaluators conducted the five interviews in January 2012. Results are summarized in Chapter 6.

35 The evaluation plan did not include interviews with ETP employer separately, as employer insights were to be gained indirectly from interviews with ETP subcontractors.

Telephone Surveys with Training Participants

The evaluation also collected primary data through surveys with a sample of CEWTP training participants. The goal of the interviews was to elicit perceptions and experiences with the program. Evaluators designed the survey instrument to elicit impressions of benefits, barriers, and level of satisfaction of the provided training. The survey asked respondents to confirm participation in training, to report attainment of certifications, and to assess the relevance of training topics with employment opportunities. The survey also asked respondents to report on their employment status and provide demographic information regarding gender, age, race, primary language, income, and education level. The training participant survey instrument appears in Appendix B, and complete survey results are presented in Appendix C.

Evaluators completed the surveys using a computer-aided telephone interview (CATI) system, where the interviewer reads the script from a computer screen. The interview was programmed to display only questions that are relevant to the respondent and skipped questions as necessary, based on responses given. The evaluation team completed 306 CATI surveys from December 21, 2011, to January 25, 2012.

Evaluators requested contact information for training participants from all EDD subgrantees, and 14 of 28 of the EDD subgrantees provided contact information for Pre-Apprenticeship and Retraining participants.[36] Several EDD subgrantees that did not provide contact information cited concerns with training participant confidentiality issues. A few mentioned the Family Educational Rights and Privacy Act (FERPA)[37] as a reason to decline providing the names of participants, as they had not procured permission from the students to submit information to the evaluators. The list of training participants obtained from EDD subgrantees represented 45 percent of EDD Pre-Apprenticeship participants enrolled and 41 percent of EDD Retraining participants enrolled.

Evaluators requested an extract of the enrollment database from ETP to obtain a list of 3,966[38] training participants from the Career Advancement program element. ETP provided an extract of the enrollment database that contained names and zip codes of training participants but did not provide phone numbers. To conduct the telephone survey, evaluators used a Telematch system where ETP participant names and zip codes were matched with telephone numbers found in public records. The list of training participants obtained from ETP represented 85 percent of the final number of participants enrolled in the ETP Career Advancement training.

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36 Contact information was not available for EDD On-the-Job Training participants at the time the request for information was made.

37 FERPA protects the privacy of students by requiring schools to have permission from the student to share specific types of information such as enrollment information.

38 This represents the number of trainees listed as enrolled in the database at the time the data were extracted and submitted by ETP staff to evaluators on October 20, 2011.

The research plan established a goal for the evaluation team to complete 400 surveys with training participants. The total number of surveys was split equally between participants from EDD and ETP, with a goal of 200 surveys with EDD participants and 200 surveys with ETP participants. The sample for completed surveys was further stratified by EDD subgrantee or ETP subcontractor for whom participant information was available. Evaluators determined the initial goal number of completed surveys per strata by setting a minimum of 10 completed surveys per strata and then allocating the remaining goal number of completed surveys proportionately across all strata. During implementation of the surveys, if the phone numbers for a stratum were depleted before the goal number of surveys was completed for that stratum, and it was impossible to achieve the goal in that stratum, the remaining goal number of surveys was reassigned randomly to other strata within either EDD or ETP.

Table 6 presents a summary of the sample design, including the targeted number of surveys to complete and the actual number of surveys completed by program element. Overall, 306 of 400 surveys were completed, achieving 92 percent of the goal for EDD Pre-Apprenticeship, 120 percent of the goal for EDD Retraining, and 53 percent of the goal for ETP Career Advancement.

Table 6: Summary of CATI Survey Sample and Respondents

Program Element	Number of Subgrantees/ Subcontractors in CEWTP Population	Number of Subgrantees/ Subcontractors Represented in Survey Sample	Percent of Enrolled Participants Available for Sample	Completed Surveys - Goal	Completed Surveys - Achieved	Percent of Completed Surveys Goal Achieved
EDD Pre-Apprenticeship	18	10	45%	139	128	92%
EDD Retraining	10	4	41%	61	73	120%
ETP Career Advancement	13	13	85%	200	105	53%
Clean Energy Workforce Development Program	41	27	63%	400	306	77%

Source: DNV KEMA

Table 7 presents a list of all EDD subgrantees and ETP subcontractors, along with (as appropriate) the targeted number of surveys and the completed number of surveys. As shown, the targeted numbers of surveys were completed with 12 of the 14 EDD subgrantees. However, the targeted number of completed surveys for ETP subcontractors was met for only one subcontractor.

Even though the overall number of responses was lower than the target number of completed surveys, the telephone surveys provided valuable information for the evaluation. The numbers

of completed surveys for the three program elements were large enough to be reasonably representative of the participants for whom contact information was available. If the training participants for whom no contact information was available were similar to the sample of participants that were included in the sample, the training participant survey results could be extended to the entire CEWTP population. However, to the extent that the excluded training participants were different from the participants for whom contact information was available, it is not possible to assess how representative the survey results would be for the full population.

Table 7: CEWTP Survey Sample Design and Survey Respondents by EDD Subgrantee and ETP Subcontractor

Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Enrollment - Achieved	Contact Information Available for Sample	Percent of Enrolled Available for Sample	Completed Surveys - Goal	Completed Surveys - Achieved	Percent of Completed Surveys Goal Achieved	Percent of Completed for Program Element	Percent of Overall Completed
EDD Pre-Apprentice-ship, Green Building	16	Hartnell College	190	-	-	-	-	-	-	-
		Humboldt County	86	-	-	-	-	-	-	-
		Imperial Valley College	29	29	100%	11	6	55%	5%	2%
		Kern/Inyo/Mono Consortium	107	-	-	-	-	-	-	-
		Long Beach Community College District (CCD)	91	77	85%	8	10	125%	9%	3%
		Los Angeles City	239	-	-	-	-	-	-	-
		Northern Rural Training and Employment Consortium	142	-	-	-	-	-	-	-
		Peralta CCD	133	89	67%	13	13	100%	11%	4%
		Richmond City	224	-	-	-	-	-	-	-
		Sacramento Employment Training Agency	232	235	101%	14	14	100%	12%	5%
		San Bernardino CCD	184	-	-	-	-	-	-	-
		San Diego Workforce Partnership	162	162	100%	16	16	100%	14%	5%
		San Francisco	85	84	99%	13	13	100%	11%	4%

Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Enrollment - Achieved	Contact Information Available for Sample	Percent of Enrolled Available for Sample	Completed Surveys - Goal	Completed Surveys - Achieved	Percent of Completed Surveys Goal Achieved	Percent of Completed for Program Element	Percent of Overall Completed
		San Luis Obispo County	126	124	98%	15	15	100%	13%	5%
		Solano Community College	461	207	45%	18	19	106%	17%	6%
		South Bay WIB	64	-	-	-	-	-	-	-
EDD Pre-Apprenticeship -- Green Building Training Programs			**2,555**	**1,007**	**39%**	**108**	**106**	**98%**	**83%**	**35%**
EDD Pre-Apprentice-ship, Clean Energy	2	College of the Desert	117	101	86%	14	14	100%	11%	5%
		Los Angeles Trade Technical College	177	177	100%	17	8	47%	6%	3%
EDD Pre-Apprenticeship -- Clean Energy Training Programs			**294**	**278**	**95%**	**31**	**22**	**71%**	**17%**	**7%**
EDD Pre-Apprenticeship Training Programs, Total			**2,584**	**1,285**	**50%**	**139**	**128**	**92%**	**100%**	**42%**
EDD Retraining, Green Building	9	Contra Costa CCD	231	273	118%	21	27	129%	37%	9%
		Grossmont-Cuyamaca CCD	251	-	-	-	-	-	-	-
		Humboldt County	94	-	-	-	-	-	-	-
		Long Beach CCD (802)	129	127	98%	9	9	100%	12%	3%
		Los Angeles County	150	-	-	-	-	-	-	-

Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Enrollment - Achieved	Contact Information Available for Sample	Percent of Enrolled Available for Sample	Completed Surveys - Goal	Completed Surveys - Achieved	Percent of Completed Surveys Goal Achieved	Percent of Completed for Program Element	Percent of Overall Completed
		Northern Rural Training and Employment Consortium	135	-	-	-	-	-	-	-
		North Orange County CCD	127	102	80%	15	16	107%	22%	5%
		Sacramento Employment Training Agency	271	270	100%	16	21	131%	29%	7%
		Sonoma County	278	-	-	-	-	-	-	-
EDD Retraining -- Green Building Training Programs			**1,666**	**772**	**46%**	**61**	**73**	**120%**	**100%**	**24%**
EDD Retraining, Clean Energy	1	Kern CCD	232	-	-	-	-	-	-	-
EDD Retraining -- Clean Energy Training Programs			**232**	**-**	**-**	**-**	**-**	**-**	**0%**	**0%**
EDD Retraining Training Programs, Total			**1,898**	**772**	**41%**	**61**	**73**	**120%**	**100%**	**24%**
ETP Career Advance-ment	13	CA Labor Federation, American Federation of Labor and Congress of Industrial Organizations (AFL-CIO)	2,643	2,054	78%	51	50	98%	48%	16%
		Cal & Nevada Labor Management Cooperation Trust	361	311	86%	16	16	100%	15%	5%

Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Enrollment - Achieved	Contact Information Available for Sample	Percent of Enrolled Available for Sample	Completed Surveys - Goal	Completed Surveys - Achieved	Percent of Completed Surveys Goal Achieved	Percent of Completed for Program Element	Percent of Overall Completed
		California Building Performance Contractors Association	330	330	100%	17	1	6%	1%	0%
		Chabot-Las Positas CCD	60	58	97%	11	3	27%	3%	1%
		Efficiency First, Inc.	163	136	83%	13	4	31%	4%	1%
		Farmworker Institute of Education and Leadership Development	134	131	98%	13	1	8%	1%	0%
		Home Energy Systems	16	12	75%	10	-	0%	0%	0%
		Mendocino Solar Service	5	5	100%	5	1	20%	1%	0%
		Northern California Solar Energy Association, Inc.	37	36	97%	11	1	9%	1%	0%
		ONNI, Inc. dba GreenPlumbers®USA	318	318	100%	16	9	56%	9%	3%
		Plumbing & Piping Industry (Apprentice & Journeymen Training Trust Fund Of The Southern California)	76	76	100%	12	6	50%	6%	2%
		Santa Monica CCD	218	218	100%	14	7	50%	7%	2%

Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Enrollment - Achieved	Contact Information Available for Sample	Percent of Enrolled Available for Sample	Completed Surveys - Goal	Completed Surveys - Achieved	Percent of Completed Surveys Goal Achieved	Percent of Completed for Program Element	Percent of Overall Completed
		Shasta Tehama Trinity Joint CCD	61	59	97%	11	6	55%	6%	2%
ETP Career Advancement Training Programs, Total			**4,422**	**3,744**	**85%**	**200**	**105**	**53%**	**100%**	**34%**
CEWTP Total[1]			**9,169**	**5,801**	**63%**	**400**	**306**	**77%**		**100%**

[1] Contact information was not available for EDD OJT participants.

Source: DNV KEMA

Table 8 presents the confidence bounds for the CATI survey questions. The widest confidence interval occurs when exactly 50 percent of the respondents provide a given answer. As the proportion of participants approaches either 0 percent or 100 percent, the confidence interval gradually approaches ±0 percent. The three columns on the right of the table provide the percentage points to be added to and subtracted from an estimate of 50 or 50, 20 or 80, and 10 or 90 percent, respectively, to obtain the 90 percent confidence bounds. For the CEWTP program elements, the widest confidence intervals, at the 50 percent response level, are ±7 percent for the EDD Pre-Apprenticeship program element, ±8 percent for the ETP Career Advancement program element, and ±9 percent for the EDD Retraining program element. For example, if 50 percent of the participants from the EDD Retraining program element reported attending training related to design, building, and construction, the confidence band would be from 41 percent (50 minus 9 percent) to 59 percent (50 plus 9 percent) at the 90 percent confidence level.

The calculation of the confidence bounds also depends upon the number of respondents for a specific question. The number of respondents is reported at the bottom of each table or figure of survey results in Chapter 7 and Appendix C, and the confidence bounds reported in Table 8 are applicable to questions that all respondents answered. Questions with a lower number of respondents have wider confidence bands.

Table 8: Confidence Bounds for CATI Survey Results

Program Element	Sample of Training Participants With Available Contact Information	CATI Surveys Completed	90% Confidence Bounds (+/-)		
			50/50%	20/80%	10/90%
EDD Pre-Apprenticeship	1,285	128	7%	6%	4%
EDD Retraining	772	73	9%	8%	5%
ETP Career Advancement	3,744	105	8%	6%	5%
CEWTP Total	5,801	306	5%	4%	3%

Source: DNV KEMA

CHAPTER 4:
Building Capacity and Meeting Needs of California's Labor Market

This chapter addresses how well the program performed in terms of building capacity for clean energy training to meet the needs and characteristics of California's labor market. It provides evaluation results indicating how well the training activities aligned with local labor market needs and whether the program made effective use of the sector strategy approach. It also assesses if the program effectively targeted groups that were expected to require clean energy training, whether it incorporated relevant training content, and, finally, if opportunities were provided for standardized, certified training leading to the creation of career pathways.

Overall, the results of the evaluation indicate:

- The use of sector strategies effectively engaged local clean energy workforce advisory groups and potential employers during the planning stages of the program to ensure that the training provided would meet the needs of the local labor market.
- The design and implementation of the Clean Energy Workforce Training Program included efforts to target specific types of workers who were expected to require training on clean energy industry topics and skills.
- The Clean Energy Workforce Training Program contributed toward the goal of building capacity within the clean energy industry workforce by incorporating relevant and appropriate training content.
- Clean Energy Workforce Training Program activities were not only designed and implemented to meet industry and employer needs, they were also successful in furthering trainees on their career paths.

This chapter begins with a summary of the training needs of the labor market as projected in the California WE&T Needs Assessment.[39] This summary sets the stage for understanding the expectations about the types and numbers of jobs or workers that would need training.

The WE&T Needs Assessment analysis was completed and the report was published in 2011, well after the CEWTP agreements had been executed and program activities had begun. As such, the results of the analyses from the WE&T Needs Assessment were not available during the CEWTP program planning phase. The fundamental CEWTP program design relied on information from other sources (many of which were also used as foundational data sources in the development of the WE&T Needs Assessment). Therefore, the WE&T Needs Assessment

39 *California Workforce Education & Training Needs Assessment for Energy Efficiency, Distributed Generation, and Demand Response*, 2011, Institute for Research on Labor and Employment, University of California, Berkeley, available from *http://www.irle.berkeley.edu/research/greeneconomy/* (accessed July 28, 2013).

results are presented to provide useful context and a means of comparing the alignment of CEWTP training activities with the projected labor market needs.

The remainder of this chapter presents a characterization of the CEWTP training activities, including steps taken to build capacity for clean energy training and meet the needs and characteristics of California's labor market. DNV KEMA provides an overview of the sector strategy approach, describes how the different training programs were designed to target groups that were expected to require clean energy training, documents how subgrantees and subcontractors incorporated relevant training content, and, finally, summarizes the opportunities provided for standardized, certified training.

Anticipating the Training Needs for California's Clean Energy Sector

The WE&T Needs Assessment presents job effects of energy efficiency policies with projections of labor needs in specific areas and an overview of workforce development infrastructure in California. The study was limited to three strategies or segments of the clean energy sector: energy efficiency, demand response, and distributed generation. The study uses the term "energy efficiency" as shorthand to refer to all three of these strategies or segments. Collectively, the study refers to these three strategies or segments as "demand-side management" (DSM), reflecting the focus on the customer side of the energy market.

The first part of the WE&T Needs Assessment reviewed the labor markets throughout California and projected the numbers of new jobs and workers that would need training in energy efficiency. The estimates were based on assumptions of the investments in energy efficiency being made from a combination of sources including federal, state, IOU programs, publicly owned utility (POU) programs, local government programs, and standards. Each source of investment was expected to lead to job growth in various industries and to require workers to have specific types of training. Table 9 shows the sources of investment in clean energy and the industries in which job growth is expected, with the related occupations within those industries that will require training for workers.

The WE&T Needs Assessment looked at the standard occupational codes for the types of workers listed in the table described above and limited its analysis to nine occupation groups related to energy efficiency. Table 10 shows the number and proportion of direct workers projected to need training in energy efficiency during the five-year period from 2010 to 2015 by occupational group. As shown, the study projected that almost 52,000 workers will require training in energy efficiency by 2015, with about 53 percent of those being in the construction trades and another 16 percent being in the mechanical and electrical trades.

Table 9: Clean Energy Sector Investment Sources, Anticipated Job Growth, and Workers Requiring Training

Clean Energy Sector Strategy	Investment Source[1]	California Industries With Anticipated Job Growth	Workers Requiring Training
Energy efficiency	Federal programs Utility energy efficiency programs California codes and standards Big Bold Energy Efficiency Strategies	Electrical contractors Plumbing, heating and air conditioning contractors Drywall and insulation contractors Engineering, architectural and other technical consulting services New building construction Corporate, subsidiary, and regional managing offices Office administrative services	Carpenters, electricians, plumbers Cement masons and finishers Pipefitters and steamfitters Drywall and ceiling tile installers Sheet metal workers Heating, air conditioning and refrigeration mechanics and installers Construction laborers, managers and supervisors Customer service representatives General and operations managers Business operations specialists Civil engineers, architects Management analysts
Distributed generation	CA solar initiative New solar homes partnership and POU solar programs Self-generation incentive program Emerging renewable program	Semiconductor and related device manufactures Electrical contractors Plumbing, heating and air conditioning contractors Roofing contractors Corporate, subsidiary, and regional managing offices Office administrative services	Electricians, carpenters Heating, air conditioning and refrigeration mechanics and installers Construction managers and supervisors Customer service representatives General and operations managers Business operations specialists
Demand response	Utility programs for residential and non-residential sectors	Automatic environmental control manufacturing for residential, commercial and appliance use Electrical contractors Corporate, subsidiary, and regional managing offices Office administrative services	Electricians Customer service representatives General and operations managers Business operations specialists

[1] Investment source refers to source of financial or policy support for energy efficiency.

Source: DNV KEMA summarized information contained in WE&T Needs Assessment, 2011, pp. 43-61, available from *http://www.irle.berkeley.edu/research/greeneconomy/* (accessed July 28, 2013).

Table 10: Occupational Groups and Projected Number of Workers Requiring Training

Occupational Group	Workers Expected to Need Energy Efficiency Training 2010-2015	
	Projected Number	Percent of Total Projected
Administration	2,205	4%
Administration (Sales Related)	3,110	6%
Architecture and Engineering	2,812	5%
Building Envelope (Construction Trades)	27,452	53%
Building Envelope (Performance Trades)	1,004	2%
Management (Blue Collar)	5,883	11%
Management (White Collar)	1,096	2%
Manufacturing	48	< 1%
Mechanical and Electrical Trades	8,286	16%
Total	51,896	100%

Source: WE&T Needs Assessment, 2011, available from *http://www.irle.berkeley.edu/research/greeneconomy/* (accessed July 28, 2013). Evaluators calculated percentages.

This section has set the stage for understanding the expectations about the types and numbers of jobs or workers that would need training. The next section provides an overview of how CEWTP was designed to build capacity for clean energy training and meet the needs and characteristics of California's labor market.

Using Sector Approach to Ensure Alignment with Local Labor Market Needs

A strategic requirement of CEWTP was to use "sector strategies" to develop the focus of the training programs. Sector strategies leverage partnerships between employers, training providers, labor organizations, and other stakeholders to identify workforce needs within an industry sector in a geographic region, and to develop training plans relevant to those needs.

The California Green Collar Jobs Act of 2008 (Assembly Bill 3018, Núñez, Chapter 312, Statutes of 2008) mandated the California WIB (CWIB) to use a sector strategy approach in responding to industry sector workforce and economic development needs. [40] In addition to being

40 *California Green Collar Jobs Act of 2008*, Assem. Bill 3018, 2007-2008 Reg. Sess., ch. 312, 2008 Cal. Stat., available from *http://www.leginfo.ca.gov/pub/07-08/bill/asm/ab_3001-3050/ab_3018_bill_20080926_chaptered.html* (accessed 9/11/2013).

promoted by the California WIB, sector strategies were identified in the WE&T Needs Assessment as an important approach to be used by the various institutions offering energy efficiency training in California. According to the WE&T Needs Assessment, sector strategies are beneficial to businesses, employees, and communities. For example:

- Businesses can reduce costs for recruiting and hiring by specifying the skill sets desired and having a pipeline of potential employees trained in areas relevant to jobs.
- Employees can increase their access to training relevant to local job opportunities and improve the likelihood of being hired or to advance their careers.
- Communities can benefit by more efficient use of resources for training and by a reduction in unemployment.

CEWTP supported the use of sector strategies to engage industry sector employers or representative industry and professional associations during the planning stages of the program to ensure that the training provided would meet the needs of the local labor market.

The EDD SFP, which was issued in August 2009, outlined the sector strategy approach and required applicants to designate a lead agency, either a local WIB or a CCD (or local Community College), and to demonstrate a partnership with the other. Applicants were encouraged to create or expand regional partnerships with local training organizations, public/private employers, community and business development organizations, labor organizations, and other key stakeholders. Each regional partnership was required to establish an advisory green employer council, including at least one representative from each industry in which the applicant proposed to provide training. The proposals and resulting agreements with EDD subgrantees described these partnerships and how the information obtained from the stakeholders was relevant to their planned training activities.

Similar to EDD's agreements, the agreements for ETP subcontractors also described collaborations between employers and training providers and specified the employment requirement for trainees.

Table 11 presents an overview of various categories of stakeholders mentioned in EDD and ETP agreements as having been engaged in developing training program activities. Appendix A provides a complete list of specific stakeholders for EDD subgrantees and ETP subcontractors.

Table 11: Number of Training Programs Partnering with Different Types of Stakeholders

Program Element	Number of Training Programs	Number of Training Programs Partnering With Different Types of Stakeholders							
		WIBs	Community Colleges	Employers	Economic Development	Labor Organizations	Local Government	One Stop Career Centers	Other
EDD Pre-Apprenticeship – Green Building	16	14	16	13	7	7	13	12	13
EDD Pre-Apprenticeship – Clean Energy	2	1	2	1	2	2	1	1	2
EDD Pre-Apprenticeship Total	18	15	18	14	9	9	14	13	15
EDD Retraining – Green Building	9	8	8	9	4	5	8	8	7
EDD Retraining – Clean Energy	1	1	1	1	1	1	1	0	0
EDD Retraining Total	10	9	9	10	5	6	9	8	7
EDD Total	28	24	27	24	14	15	23	21	22
ETP Career Advancement	13	1	8	6	2	6	2	2	4
CEWTP Total	**41**	**25**	**35**	**30**	**16**	**21**	**25**	**23**	**26**

Source: EDD and ETP proposals and agreements

The Municipal and Commercial Building Targeted Retrofit Program (MCR), another ARRA-funded program administered by the Energy Commission, also engaged with some of the same CEWTP partnership organizations and stakeholders, indicating alignment within and across the state's portfolio of programs. For example, the EnergySmart Jobs program, implemented by PECI as one of the three MCR program components, offered jobs skills training in partnership with various community colleges throughout California, as well as in coordination with similar efforts involving utilities, contractors, and technology manufacturers. In addition, the Energy Technology Assistance Program, implemented by Energy Solutions, offered green internships and employment opportunities for the Workforce Institute,[41] community college, and green-certification program graduates. Finally, the Oakland Shines Program, implemented by Quest, facilitated the creation of energy efficiency jobs by partnering and collaborating with local government workforce organizations, energy efficiency partnerships, and community/economic development agencies.

Targeting Specific Types of Workers Expected to Require Clean Energy Training

The design and implementation of the CEWTP included efforts to target specific types of workers who were expected to require training on clean energy industry topics and skills. Targeted workers were identified within three dimensions or groups: employment status, trade groups,[42] and underrepresented groups. Each of these dimensions is discussed below.

Employment Status

CEWTP was designed during the height of the recession, when California had a high rate of unemployment. Using data on employed and unemployed workers from the U.S. Census 2009 American Community Survey (ACS), the WE&T Needs Assessment calculated unemployment rates for relevant occupation groups (the same nine groups listed above in Table 11 as requiring training). Overall, the unemployment rate for these groups was estimated at about 10 percent for 2009. Much higher unemployment rates were estimated for building envelope (construction) and mechanical and electrical trade occupations (20 percent and 16 percent, respectively).[43] Even though the WE&T Needs Assessment projected that demand for new workers in these two occupation groups would increase within five years, the study goes on to indicate that most, if not all, new jobs will be filled by unemployed workers. As such, the WE&T Needs Assessment recommended that training activities should target and address needs specific to unemployed (as well as underemployed) workers.

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41 The Workforce Institute is a division of the San Jose Evergreen Community College District.

42 Throughout this report, "trade groups" refers to targeted groups of trades, such as the construction, electrical, and plumbing trades, for which specific training activities were designed.

43 WE&T Needs Assessment, p. 80, available from *http://www.irle.berkeley.edu/research/greeneconomy/* (accessed July 28, 2013).

Even though the WE&T Needs Assessment analysis and recommendations were not available when CEWTP training activities were being designed, high unemployment rates within these specific occupational groups were well understood. CEWTP training activities were designed to anticipate the need for training and retraining of these types of workers. For example, the EDD SFP established requirements for targeting unemployed and underemployed workforce segments within the Pre-Apprenticeship and Retraining program elements.

Table 12 summarizes the "workforce status" (or type of workers targeted) for the relevant CEWTP program elements. As shown, almost all of the EDD Pre-Apprenticeship and Retraining subgrantees emphasized recruiting underemployed and unemployed workers. The Pre-Apprenticeship subgrantees also focused on recruiting new workforce entrants.

Table 12: Number of Training Programs Targeting Different Types of Workers

Program Element	Number of Training Programs by Program Element	Number of Training Programs Targeting Different Types of Workers			
		Underemployed	Unemployed	New Workforce	Incumbent Workers
EDD Pre-Apprenticeship	18	17	16	16	2
EDD Retraining	10	9	9	2	4
EDD Total	28	26	25	18	6
ETP Career Advancement	13	3	3	6	11
CEWTP Total	**41**	**29**	**28**	**24**	**17**

Source: EDD and ETP proposals and agreements

As mentioned above, ETP had somewhat different goals in terms of the types of workers targeted and recruited for training. Consistent with underlying goals and requirements of ETP, Career Advancement subcontractors focused on targeting and recruiting incumbent workers as well as new hires and unemployed workers, as shown in Table 12.

The WE&T Needs Assessment projects significant training needs for workers within specific trades such as construction, electricians, and plumbers. For the most part, these needs were driven by ARRA-funded programs to install appropriate energy-efficient equipment in existing residential and commercial or government buildings. CEWTP training activities were designed to target workers within these trade groups. As shown in Table 13, nearly all EDD subgrantees planned to target construction workers for training. Many subgrantees (19 out of 28) planned to target electricians, and 17 out of 28 subgrantees planned to train plumbers.

Table 13: Number of EDD-Administered Training Programs Targeting Specific Trade Groups

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Targeting Different Trade Groups		
			Construction Workers	Electricians	Plumbers
EDD Pre-Apprenticeship, Green Building	16	Hartnell College	•	•	•
		Humboldt County	•	•	•
		Imperial Valley College	•	•	
		Kern/Inyo/Mono Consortium	•	•	•
		Los Angeles City	•	•	•
		Long Beach CCD	•		
		Northern Rural Training and Employment Consortium	•		
		Peralta CCD	•	•	
		Richmond City	•		
		San Bernardino CCD	•		•
		San Diego Workforce Partnership	•		•
		San Francisco	•	•	•
		Sacramento Employment Training Agency	•	•	•
		San Luis Obispo County	•	•	•
		Solano Community College	•	•	
		South Bay WIB	•	•	
Number of EDD Pre-Apprenticeship – Green Building Training Programs Targeting Construction Workers, Electricians, and Plumbers			16	11	9

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Targeting Different Trade Groups		
			Construction Workers	Electricians	Plumbers
EDD Retraining, Green Building	9	Contra Costa CCD	•		•
		Grossmont-Cuyamaca CCD	•		
		Humboldt County	•	•	•
		Long Beach CCD (802)	•		•
		Los Angeles County	•	•	•
		Northern Rural Training and Employment Consortium	•		
		North Orange County CCD	•	•	•
		Sacramento Employment Training Agency	•	•	•
		Sonoma County	•	•	•
Number of EDD Retraining – Green Building Training Programs Targeting Construction Workers, Electricians and Plumbers			9	5	7
EDD Pre-Apprentice-ship, Clean Energy	2	College of the Desert	•	•	•
		Los Angeles Trade Technical College		•	
Number of EDD Retraining – Clean Energy Training Programs Targeting Construction Workers, Electricians and Plumbers			1	2	1
EDD Retraining, Clean Energy	1	Kern CCD	•	•	
Number of EDD Retraining – Clean Energy Training Programs Targeting Construction Workers, Electricians and Plumbers			1	1	0
Number of EDD Training Programs Targeting Construction Workers, Electricians and Plumbers			**27**	**19**	**17**

Source: EDD proposals and agreements

Table 14: Number of ETP-Administered Training Programs Targeting Specific Trade Groups

ETP Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Targeting Different Trade Groups		
			Construction Workers	Electricians	Plumbers
ETP Career Advancement	13	Cal & Nevada Labor Management Cooperation Trust	•	•	
		Farmworker Institute of Education and Leadership Development	•	•	
		Home Energy Systems		•	
		Shasta Tehama Trinity Joint CCD	•	•	
		Northern California Solar Energy Association, Inc.	•	•	
		CA Labor Federation AFL-CIO	•	•	•
		Plumbing & Piping Industry (Apprentice & Journeymen Training Trust Fund Of The Southern California)	•		•
		Santa Monica CCD	•		
		Mendocino Solar Service	•	•	
		Onni, Inc.[1] dba Green*Plumbers*® USA	•		•
		Efficiency First, Inc.	•	•	
		Chabot-Las Positas CCD	•	•	
		California Building Performance Contractors Association	•	•	
Number of ETP Career Advancement Training Programs Targeting Construction Workers, Electricians, and Plumbers			**12**	**10**	**3**

[1] ONNI was acquired by the International Association of Plumbing and Mechanical Officials (IAPMO), a non-profit organization. The "dba" reference remains the same.

Source: ETP proposals and agreements. ETP provided updated information July 2013.

The ETP Career Advancement program element included an employment requirement by design, and some subcontractors were directly involved with workers in these trades. As shown in Table 14, most subcontractors planned to target workers in either construction trades or electricians, or both, with two labor organizations targeting plumbers.

Underrepresented Groups

Several specific groups of workers face challenges for entering the clean energy workforce and retaining a job and are underrepresented in the workforce. The WE&T Needs Assessment assessed the current labor supply in California and identified several demographic groups that are underrepresented in the energy efficiency workforce, especially the trades being targeted for CEWTP training.[44] Using data cited from the American Community Survey (ACS), the WE&T Needs Assessment indicated that fewer women than men are employed in all nine energy efficiency-related occupation groups, with the largest gender discrepancy in the building envelope (construction) and mechanical and electrical trades. The WE&T Needs Assessment also identified an age discrepancy in these occupation groups, with the groups having a smaller proportion of workers under the age of 25 than in the total California workforce. The age imbalance can indicate the need for workers to replace the older workers when they retire. The WE&T Needs Assessment also reports that these two occupational groups have a high number of workers that have less than a high school diploma. Workers with lower levels of education may require additional training in math or other basic skills to prepare them to learn advanced skills in their occupations.

The EDD Pre-Apprenticeship program element was designed to reduce the barriers of joining the clean energy workforce for several underrepresented groups such as at-risk youth, veterans, women, workers with limited English language skills, workers from low-income households, or workers without a high school diploma or GED test. The EDD SFP stated that bonus points would be awarded to Pre-Apprenticeship program applicants that served at least 25 percent of the total participants from one or more underrepresented groups.

Table 15 shows the underrepresented groups that were targeted by EDD subgrantees to be recruited into their training programs, according to their agreements. As shown, almost all of the Pre-Apprenticeship subgrantees planned to target recruiting workers younger than 25 years of age, veterans, chronically unemployed, workers from low-income households, and those with less than a high school diploma. Although including these groups did not warrant bonus points toward their funding applications, 4 of 10 Retraining subgrantees included veterans and chronically unemployed as groups they intended to recruit for training, and 3 of 10 also included workers under 25 years of age and workers with prior criminal convictions.

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44 WE&T Needs Assessment, p. 79-83, available from *http://www.irle.berkeley.edu/research/greeneconomy/* (accessed July 28, 2013).

Table 15: Number of EDD-Administered Training Programs Targeting Underrepresented Groups

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Targeting Underrepresented Groups											
			At-risk youth (18-24)	Veterans	Chronic unemployed	Household incomes <50% of median	Lack a GED or HS diploma	Prior criminal convictions	Limited English skills or speak English as a 2nd language	Receive public assistance	Females	Custodial single parents	Homeless	People with disabilities
EDD Pre-Apprentice-ship, Green Building	16	Hartnell College												
		Humboldt County	•	•		•	•	•	•	•				•
		Imperial Valley College	•		•	•	•			•				
		Kern/Inyo/Mono Consortium	•	•	•	•	•	•	•	•	•	•	•	
		Los Angeles City	•	•	•	•	•	•	•		•		•	•
		Long Beach CCD		•	•	•	•				•			
		Northern Rural Training and Employment Consortium	•	•	•	•	•	•	•	•		•		
		Peralta CCD	•	•	•	•			•	•	•			
		Richmond City	•											
		San Bernardino CCD	•		•	•	•	•	•		•			
		San Diego Workforce Partnership	•	•	•	•	•		•	•		•	•	•
		San Francisco												

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Targeting Underrepresented Groups											
			At-risk youth (18-24)	Veterans	Chronic unemployed	Household incomes <50% of median	Lack a GED or HS diploma	Prior criminal convictions	Limited English skills or speak English as a 2nd language	Receive public assistance	Females	Custodial single parents	Homeless	People with disabilities
		Sacramento Employment Training Agency	•	•	•	•	•	•		•	•			
		San Luis Obispo County	•	•	•	•	•						•	
		Solano Community College	•	•										
		South Bay WIB	•			•		•	•			•		
Number of EDD Pre-Apprenticeship – Green Building Training Programs Targeting Underrepresented Groups			13	10	10	12	10	7	8	7	6	4	4	3

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Targeting Underrepresented Groups											
			At-risk youth (18-24)	Veterans	Chronic unemployed	Household incomes <50% of median	Lack a GED or HS diploma	Prior criminal convictions	Limited English skills or speak English as a 2nd language	Receive public assistance	Females	Custodial single parents	Homeless	People with disabilities
EDD Retraining – Green Building	9	Contra Costa CCD												
		Grossmont-Cuyamaca CCD												
		Humboldt County	•	•		•	•	•	•	•				•
		Long Beach CCD		•										
		Los Angeles County												
		Northern Rural Training and Employment Consortium	•	•	•	•	•	•	•	•	•	•		
		North Orange County CCD	•	•				•						
		Sacramento Employment Training Agency			•									
		Sonoma County			•									
Number of EDD Retraining – Green Building Training Programs Targeting Underrepresented Groups			3	4	3	2	2	3	2	2	1	1	0	1

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Targeting Underrepresented Groups											
			At-risk youth (18-24)	Veterans	Chronic unemployed	Household incomes <50% of median	Lack a GED or HS diploma	Prior criminal convictions	Limited English skills or speak English as a 2nd language	Receive public assistance	Females	Custodial single parents	Homeless	People with disabilities
EDD Pre-Apprentice-ship, Clean Energy	2	College of the Desert	•	•	•	•		•	•	•	•	•		
		Los Angeles Trade Technical College	•	•			•	•			•			
Number of EDD Retraining – Green Building Training Programs Targeting Under-Represented Groups			2	2	1	1	1	2	1	1	2	1	0	0
EDD Retraining, Clean Energy	1	Kern CCD			•									
Number of EDD Retraining – Green Building Training Programs Targeting Under-Represented Groups			0	0	1	0	0	0	0	0	0	0	0	0
Number of EDD Training Programs Targeting Underrepresented Groups			**18**	**16**	**15**	**15**	**13**	**12**	**11**	**10**	**9**	**6**	**4**	**4**

Source: EDD proposals and agreements

According to information provided within the WIA close-out reports, EDD subgrantees were successful in enrolling a considerable number of training participants that exhibited many of these targeted characteristics. For example:

- Gender – Across all EDD subgrantees, 13 percent of participants enrolled in training activities were female, and 87 percent were male.
- Age – Eleven percent of participants enrolled in EDD subgrantee training activities were 21 years of age or younger, and another 20 percent were 22 to 29 years of age. The largest group of participants enrolled in EDD subgrantee training activities was 30 to 54 years of age (57 percent). The remaining (12 percent) were 55 years of age or older.
- Ethnicity[45] – Across all EDD subgrantees, 43 percent of participants enrolled in training activities were White, 29 percent were Hispanic, 21 percent were African-American, 7 percent were Asian, 3 percent were American Indian or Alaskan Native, and 1 percent was Hawaiian Native or Other Pacific Islander.
- Veterans –Nine percent of the participants enrolled in EDD subgrantee training activities were veterans.
- Disabled – Across all EDD subgrantees, 3 percent of participants enrolled in training activities were disabled.
- Low-income – More than half (56 percent) of the participants enrolled in EDD subgrantee training activities were categorized in the EDD documentation as "low income." Another three percent were Temporary Assistance to Needy Families (TANF) recipients.

The ETP Career Advancement program element was designed to address the training needs of incumbent workers or new hires, so there was limited opportunity to recruit workers from underrepresented groups. ETP guidelines for the CEWTP program specified goals including to assist those most affected by recession, for example, regions of high unemployment, and to provide training for workers in need, for example, low-income, displaced and underskilled adults and disconnected youth. The guidelines also stated, "Training for these special populations will be developed by ETP consistent with existing pilots and other efforts in the 'core program' to reach veterans, ex-offenders/at-risk youth, persons with multiple barriers to employment, and persons with poor literacy skills."[46] Only one subcontractor, Home Energy Systems, indicated in its contract that it planned to train at-risk young workers under 25 years of age.

That said, according to the ETP's database of participants, the following types of workers were enrolled in ETP subcontractor training activities:

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45 Individuals often use more than one category to classify their ethnicity. As such, these percentages total more than 100 percent.

46 Information provided by ETP staff to evaluators April 2013.

- Gender – About 5 percent of participants enrolled in ETP subcontractor training activities were female, and 95 percent were male.
- Age – Six percent of participants enrolled in ETP subcontractor training activities were less than 25 years of age, 25 percent were 25 to 34 years of age, and 57 percent were 35 to 54 years of age. The remaining (13 percent) were 55 years of age or older.
- Educational attainment – Eight percent of the participants enrolled in ETP subcontractor training activities had completed 8th grade (as their highest level of educational attainment), 2 percent had completed some high school-level classes, and 15 percent had passed the GED test. Another 30 percent had received a high school diploma, 16 percent had attended some college courses, and 23 percent were college graduates. The remaining (6 percent) were postcollege graduates.
- Ethnicity – Across all ETP subcontractors, 55 percent of participants enrolled in training activities were White, 26 percent were Hispanic, 8 percent were African-American, 5 percent were Asian, 1 percent was American Indian or Alaskan Native, 1 percent were Hawaiian Native or Other Pacific Islander, and 1 percent were Filipino. Another 3 percent were "Other."
- Veterans – Two percent of participants enrolled in ETP subcontractor training activities were veterans.
- Disabled – Across all ETP subcontractors, less than 1 percent of participants enrolled in training activities were disabled.

Other ARRA-funded programs also incorporated workforce education and training that were targeted to these same types of underrepresented groups. For example, within the MCR Program, the EnergySmart Jobs program partnered with the California Conservation Corp, a California state agency that works with young people to improve California's natural resources, to conduct energy audits and install energy efficiency measures in grocery and small convenience stores.

Incorporating Relevant Training Content

Another step to ensuring that the program was contributing toward the goal of building capacity within the clean energy industry workforce included verifying that it incorporated relevant and appropriate training content. This includes an assessment of the specific topics and technologies addressed by the training curricula, as well as whether or not training was offered to improve other employment-related skills.

Topics Addressed by Training

The content addressed in the various training activities contributed to the CEWTP goal of building capacity within the clean energy industry workforce.

Preexisting training curricula were used where available (or developed where needed). The SFP required the Pre-Apprenticeship program and Retraining Green Building program elements to offer training to cover building-related, energy efficiency topics for residential or commercial buildings. The Clean Energy program elements were required to offer specialized training in a

renewable energy field, including job skills in generation, transmission, distribution, or a combination of these areas.

Table 16 presents the topics addressed in the various training activities by EDD subgrantees, according to the information contained in the subgrantee agreements. As shown, almost all of the EDD Green Building subgrantees included training that covered design and analysis, installation, and building energy audit topics, and the majority covered safety or health and maintenance of systems. Some of the EDD Green Building subgrantees designed training activities to address building inspections, while others included activities addressing building commissioning. The SFP specifically emphasized that the EDD Green Building program elements should address training on compliance with the State Energy Efficiency Standards. However, only 9 of the 25 EDD Green Building subgrantees indicated in their agreements that Title 24 code training would be covered.

Consistent with the program design, the EDD Clean Energy subgrantees focused on the installation and maintenance of systems and included training pertaining to safety or health issues related to working with these systems.

The subcontractors in the ETP Career Advancement program element addressed specific topics pertinent to their specific needs in preparation of their trainees fulfilling the employment requirement. The majority of subcontractors included analysis or design and inspections, as shown in Table 17.

Technologies Addressed by Training

Throughout California, a wide range of programs received ARRA funding. These programs were projected to create demand for workers skilled in HVAC, lighting, insulation, roofing, solar technologies, and building performance topics applicable in residential and commercial settings.[47] The majority of EDD subgrantees addressed these types of technologies in their training, as shown in Table 18. Technologies that were commonly addressed include renewable energy systems and related equipment, such as solar, wind and PV, water management and building envelope measures, and HVAC equipment.

Since the ETP Career Advancement program element was designed to train incumbent workers or new hires, the subcontractors could design their training to address end uses that were most relevant to the immediate employment opportunities of their trainees. The technologies addressed in training implemented by the ETP subcontractors varied, but almost all of them provided training in heating technologies and building envelope measures, as shown in Table 19.

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47 *California Energy Commission, 2011. 2010 Integrated Energy Policy Report Update.* Publication Number: CEC-100-2010-001-CMF, is available from http://www.energy.ca.gov/2010publications/CEC-100-2010-001/CEC-100-2010-001-CMF.PDF (accessed 7/28/2013).

Table 16: Number of EDD-Administered Training Programs Addressing Different Energy-Related Topics

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing Different Energy-Related Topics										
			Analysis/ Design	Installation	Building Energy Audit	Safety/ Health	Main-tenance	Inspection	Comm-issioning	Title 24	Incentives/ Policy	Sales/ Marketing	Manu-facturing
EDD Pre-Apprentice-ship, Green Building	16	Hartnell College		•									
		Humboldt County	•	•	•	•	•						
		Imperial Valley College	•	•	•	•	•	•			•		
		Kern/Inyo/Mono Consortium		•			•						
		Los Angeles City	•	•	•		•				•		
		Long Beach CCD	•		•	•	•		•		•		
		Northern Rural Training and Employment Consortium	•	•	•	•		•					
		Peralta CCD	•	•	•								
		Richmond City		•	•	•	•		•			•	
		San Bernardino CCD	•	•	•	•		•		•			
		San Diego Workforce Partnership		•	•		•		•				
		San Francisco	•	•	•	•						•	
		Sacramento Employment Training Agency	•	•	•	•		•		•		•	
		San Luis Obispo County	•	•	•	•	•			•			
		Solano Community College	•	•	•		•		•				
		South Bay WIB	•	•	•	•			•	•			
Number of EDD Pre-Apprenticeship – Green Building Training Programs Addressing Training Topics			12	15	14	10	9	4	5	4	3	3	0

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing Different Energy-Related Topics										
			Analysis/ Design	Installation	Building Energy Audit	Safety/ Health	Main-tenance	Inspection	Comm-issioning	Title 24	Incentives/ Policy	Sales/ Marketing	Manu-facturing
EDD Retraining, Green Building	9	Contra Costa CCD	•	•	•		•						
		Grossmont-Cuyamaca CCD	•	•	•	•		•		•	•		
		Humboldt County	•	•			•						
		Long Beach CCD	•		•	•		•	•	•	•		
		Los Angeles County	•	•	•	•		•	•				
		Northern Rural Training and Employment Consortium	•	•	•	•	•	•	•				
		North Orange County CCD	•	•	•	•	•			•			
		Sacramento Employment Training Agency	•	•	•		•	•	•	•	•		
		Sonoma County	•	•						•	•	•	
Number of EDD Retraining – Green Building Training Programs Addressing Training Topics			9	8	7	5	5	5	4	5	4	1	0
EDD Pre-Apprentice-ship, Clean Energy	2	College of the Desert	•	•		•							
		Los Angeles Trade Technical College		•	•	•	•				•		
Number of EDD Pre-Apprenticeship – Clean Energy Training Programs Addressing Training Topics			1	2	1	2	1	0	0	0	1	0	0
EDD Retraining, Clean Energy	1	Kern CCD		•		•	•						
Number of EDD Retraining – Clean Energy Training Programs Addressing Training Topics			0	1	0	1	1	0	0	0	0	0	0
Number of EDD Training Programs Addressing Training Topics			**22**	**26**	**22**	**18**	**16**	**9**	**9**	**9**	**8**	**4**	**0**

Source: EDD proposals and agreements

Table 17: Number of ETP-Administered Training Programs Addressing Different Energy-Related Topics

ETP Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing Different Energy-Related Topics										
			Analysis/ Design	Installation	Building Energy Audit	Safety/Health	Maintenance	Inspection	Comm-issioning	Title 24	Incentives/ Policy	Sales/ Marketing	Manu-facturing
ETP Career Advancement	13	Cal & Nevada Labor Management Cooperation Trust	•	•			•	•	•	•			
		Farmworker Institute of Education and Leadership Development	•	•		•		•					
		Home Energy Systems	•	•		•							
		Shasta Tehama Trinity Joint CCD	•	•		•	•	•			•		
		Northern California Solar Energy Association, Inc.	•	•		•	•						
		CA Labor Federation AFL-CIO	•		•	•		•		•	•		
		Plumbing & Piping Industry (Apprentice & Journeymen Training Trust Fund Of The Southern California)	•		•			•	•				
		Santa Monica CCD	•	•	•		•						•
		Mendocino Solar Service	•	•		•	•					•	
		ONNI, Inc. dba GreenPlumbers®USA	•	•	•		•	•	•		•		
		Efficiency First, Inc.	•		•	•		•	•		•		
		Chabot-Las Positas CCD	•	•	•	•	•	•	•		•		•

ETP Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing Different Energy-Related Topics										
			Analysis/ Design	Installation	Building Energy Audit	Safety/Health	Maintenance	Inspection	Comm-issioning	Title 24	Incentives/ Policy	Sales/ Marketing	Manu-facturing
		California Building Performance Contractors Association	•	•	•	•	•	•	•	•		•	
Number of ETP Career Advancement Training Programs Addressing Training Topics			**13**	**10**	**7**	**9**	**8**	**9**	**6**	**3**	**5**	**2**	**2**

Source: ETP proposals and agreements. ETP provided updated information July 2013

Table 18: Number of EDD-Administered Training Programs Addressing Different Technologies

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing Different Technologies															
			Renewable Energy - Solar, Wind	PV	Water Management	Building Envelope	HVAC	Weatherization	General/Other/ Construction	Lighting	Commissioning	Controls/EMS	Compressed Air	Pools	Boilers/Furnaces/ Water Heating	CHP/Gas Engines	Commercial Food Service/Refrigeration	Motors/Pumps
EDD Pre-Apprenticeship, Green Building	16	Hartnell College	•	•	•	•			•									
		Humboldt County	•	•	•	•	•											
		Imperial Valley College	•	•	•	•	•	•		•		•						
		Kern/Inyo/Mono Consortium	•	•	•	•	•	•										
		Los Angeles City	•	•	•	•	•	•	•	•		•						
		Long Beach CCD	•		•	•	•		•	•	•							
		Northern Rural Training and Employment Consortium	•	•	•	•	•	•				•						
		Peralta CCD	•	•	•	•	•	•										
		Richmond City	•	•		•	•		•		•							
		San Bernardino CCD	•	•	•	•	•	•	•									
		San Diego Workforce Partnership	•	•	•	•	•	•	•	•		•						
		San Francisco	•	•	•	•	•	•		•	•							

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing Different Technologies															
			Renewable Energy - Solar, Wind	PV	Water Management	Building Envelope	HVAC	Weatherization	General/Other/ Construction	Lighting	Commissioning	Controls/EMS	Compressed Air	Pools	Boilers/Furnaces/ Water Heating	CHP/Gas Engines	Commercial Food Service/Refrigeration	Motors/Pumps
		Sacramento Employment Training Agency	•	•	•	•	•	•	•	•		•						
		San Luis Obispo County	•	•	•	•		•	•									
		Solano Community College	•	•	•	•	•	•										
		South Bay WIB	•	•	•	•	•	•	•									
Number of EDD Pre-Apprenticeship – Green Building Training Programs Addressing Different Technologies			16	15	15	16	14	12	9	6	3	5	0	0	0	0	0	0

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing Different Technologies															
			Renewable Energy - Solar, Wind	PV	Water Management	Building Envelope	HVAC	Weatherization	General/Other/ Construction	Lighting	Commissioning	Controls/EMS	Compressed Air	Pools	Boilers/Furnaces/ Water Heating	CHP/Gas Engines	Commercial Food Service/Refrigeration	Motors/Pumps
EDD Retraining, Green Building	9	Contra Costa CCD	•	•	•	•	•	•	•									
		Grossmont-Cuyamaca CCD	•	•	•	•	•	•	•						•			
		Humboldt County	•	•		•	•											
		Long Beach CCD			•	•	•	•	•	•	•	•						
		Los Angeles County	•	•	•	•	•	•	•	•	•	•						
		Northern Rural Training and Employment Consortium	•	•	•	•	•	•	•		•							
		North Orange County CCD			•	•	•		•	•		•						
		Sacramento Employment Training Agency	•	•	•	•	•	•	•	•	•	•						
		Sonoma County	•		•	•	•		•	•								
Number of EDD Retraining – Green Building Training Programs Addressing Different Technologies			7	6	8	9	9	6	8	5	4	4	0	0	1	0	0	0

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing Different Technologies															
			Renewable Energy - Solar, Wind	PV	Water Management	Building Envelope	HVAC	Weatherization	General/Other/ Construction	Lighting	Commissioning	Controls/EMS	Compressed Air	Pools	Boilers/Furnaces/ Water Heating	CHP/Gas Engines	Commercial Food Service/Refrigeration	Motors/Pumps
EDD Pre-Apprenticeship, Clean Energy	2	College of the Desert	•	•														
		Los Angeles Trade Technical College	•	•	•			•		•								
Number of EDD Pre-Apprenticeship – Clean Energy Training Programs Addressing Different Technologies			2	2	1	0	0	1	0	1	0	0	0	0	0	0	0	0
EDD Retraining, Clean Energy	1	Kern CCD	•	•														
Number of EDD Retraining – Clean Energy Training Programs Addressing Different Technologies			1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of EDD Training Programs Addressing Different Technologies			**26**	**24**	**24**	**25**	**23**	**19**	**17**	**12**	**7**	**9**	**0**	**0**	**1**	**0**	**0**	**0**

Source: EDD proposals and agreements

Table 19: Number of ETP-Administered Training Programs Addressing Different Technologies

ETP Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing Different Technologies															
			Renewable Energy - Solar, Wind	PV	Water Management	Building Envelope	HVAC	Weatherization	General/Other/ Construction	Lighting	Commissioning	Controls/EMS	Compressed Air	Pools	Boilers/Furnaces/Water Heating	CHP/Gas Engines	Commercial Food Service/Refrigeration	Motors/Pumps
ETP Career Advancement	13	Cal & Nevada Labor Management Cooperation Trust							•	•	•							•
		Farmworker Institute of Education and Leadership Development		•		•									•			
		Home Energy Systems		•		•									•			
		Shasta Tehama Trinity Joint CCD	•	•		•									•			
		Northern California Solar Energy Association, Inc.	•	•		•									•			
		CA Labor Federation AFL-CIO	•	•	•	•					•		•		•	•		•
		Plumbing & Piping Industry (Apprentice & Journeymen Training Trust Fund Of The Southern California)	•		•	•					•	•			•	•		
		Santa Monica CCD	•	•	•	•									•	•	•	

ETP Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing Different Technologies														
			Renewable Energy - Solar, Wind	PV	Water Management	Building Envelope	HVAC	Weatherization	General/Other/ Construction	Lighting	Commissioning	Controls/EMS	Compressed Air	Pools	Boilers/Furnaces/Water Heating	CHP/Gas Engines	Commercial Food Service/Refrigeration	Motors/Pumps
		Mendocino Solar Service	•	•		•								•	•	•		
		ONNI, Inc. dba GreenPlumbers®USA	•		•		•				•		•		•	•	•	
		Efficiency First, Inc.			•	•	•			•	•	•			•	•	•	
		Chabot-Las Positas CCD					•					•			•	•	•	
		California Building Performance Contractors Association	•	•	•	•	•	•			•	•	•	•	•	•	•	•
Number of ETP Career Advancement Training Programs Addressing Different Technologies			**8**	**8**	**6**	**10**	**4**	**1**	**1**	**2**	**6**	**4**	**3**	**2**	**12**	**8**	**5**	**3**

Source: ETP proposals and agreements. ETP provided updated information July 2013

General Employment-Related Skills Addressed by Training

As described in Chapter 2, the EDD SFP identified additional topics to be addressed by CEWTP training to improve general employment-related skills. Basic skills and "soft" skills training were geared toward building skills that would help them obtain and keep a job. Basic skills included math, reading, writing, and vocational English as a Second Language. Soft skills included verbal communication, accountability, ethics, performance, and professionalism. Training in basic computer and mechanical skills provided trainees with additional foundational and functional knowledge.

Table 20 summarizes the additional skills addressed by training for EDD subgrantees according to the plans outlined in the agreements. EDD Pre-Apprenticeship subgrantees provided training in basic skills based on assessments upon program entry, and all but one subgrantee (Richmond City) indicated that basic skills were covered. Training in "soft" skills was offered by almost all Pre-Apprenticeship subgrantees, and almost half of the subgrantees offered computer and mechanical training.

EDD Retraining subgrantees were not required to offer training to address these areas, but about two-thirds offered training to address basic skills, "soft" skills, and mechanical. Only two Retraining subgrantees offered training for computer skills.

Although not required per program design, several ETP subcontractors identified specific needs of their stakeholders and addressed some of these general employment-related skills in their training programs, as shown in Table 21. Computer skills training was included in five ETP Career Advancement agreements, with basic skills included in three agreements, mechanical in two agreements, and "soft" skills in one agreement.

Table 20: Number of EDD-Administered Training Programs Addressing General Employment-Related Skills

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing General Employment-Related Skills			
			Basic Skills[1]	Soft Skills[2]	Basic Computer Skills	Basic Mechanical Skills
EDD Pre-Apprenticeship, Green Building	16	Hartnell College	•		•	
		Humboldt County	•	•		•
		Imperial Valley College	•	•	•	•
		Kern/Inyo/Mono Consortium	•	•	•	•
		Los Angeles City	•	•	•	•
		Long Beach CCD	•	•	•	
		Northern Rural Training and Employment Consortium	•	•		•
		Peralta CCD	•	•		
		Richmond City			•	
		San Bernardino CCD	•	•		
		San Diego Workforce Partnership	•	•	•	
		San Francisco	•	•		
		Sacramento Employment Training Agency	•	•		
		San Luis Obispo County	•	•		
		Solano Community College	•	•		
		South Bay WIB	•	•		
Number of EDD Pre-Apprenticeship – Green Building Training Programs Addressing General Employment-Related Skills			15	14	7	5

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing General Employment-Related Skills			
			Basic Skills[1]	Soft Skills[2]	Basic Computer Skills	Basic Mechanical Skills
EDD Retraining, Green Building	9	Contra Costa CCD	•	•		•
		Grossmont-Cuyamaca CCD	•	•	•	
		Humboldt County	•	•		•
		Long Beach CCD	•	•	•	
		Los Angeles County				
		Northern Rural Training and Employment Consortium	•	•		•
		North Orange County CCD	•			•
		Sacramento Employment Training Agency				•
		Sonoma County				
Number of EDD Retraining – Green Building Training Programs Addressing General Employment-Related Skills			6	5	2	5
EDD Pre-Apprenticeship, Clean Energy	2	College of the Desert	•	•		•
		Los Angeles Trade Technical College	•			
Number of EDD Pre-Apprenticeship – Clean Energy Training Programs Addressing General Employment-Related Skills			2	1	0	1
EDD Retraining, Clean Energy	1	Kern CCD	•	•		•
Number of EDD Retraining – Clean Energy Training Programs Addressing General Employment-Related Skills			1	1	0	1
Number of EDD Training Programs Addressing General Employment-Related Skills			**24**	**21**	**9**	**12**

[1] "Basic skills" included math, reading and writing and vocational English as a Second Language.

[2] "Soft skills" included verbal communication, accountability, ethics, performance, and professionalism.

Source: EDD proposals and agreements

Table 21: Number of ETP-Administered Training Programs Addressing General Employment-Related Skills

ETP Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing General Employment-Related Skills			
			Basic Skills[1]	Soft Skills[2]	Basic Computer Skills	Basic Mechanical Skills
ETP Career Advancement	13	Cal & Nevada Labor Management Cooperation Trust				
		Farmworker Institute of Education and Leadership Development	•	•	•	
		Home Energy Systems				
		Shasta Tehama Trinity Joint CCD				
		Northern California Solar Energy Association, Inc.				
		CA Labor Federation AFL-CIO	•		•	•
		Plumbing & Piping Industry (Apprentice & Journeymen Training Trust Fund Of The Southern California)				•
		Santa Monica CCD	•		•	
		Mendocino Solar Service				
		ONNI, Inc. dba GreenPlumbers®USA				
		Efficiency First, Inc.				
		Chabot-Las Positas CCD		•	•	
		California Building Performance Contractors Association			•	
Number of ETP Career Advancement Training Programs Addressing General Employment-Related Skills			**3**	**2**	**5**	**2**

[1] "Basic skills" included math, reading and writing, and vocational English as a Second Language.

[2] "Soft skills" included verbal communication, accountability, ethics, performance, and professionalism.

Source: ETP proposals and agreements. ETP provided updated information July 2013

Types of Credentials Addressed by Training

One of the CEWTP objectives was to establish standardized, certified training in the clean energy sector. Educational degrees and industry-defined certifications are types of credentials that job candidates can present to potential employers to substantiate the skill sets that they have obtained. Credentials are considered "portable" if they have recognition and value across jobs or regions. "Stackable" credentials are building blocks that allow additional credentials to be obtained through subsequent training or acquisition of advanced skills.[48]

Credentials vary in the amount of time, experience, and complexity of skill sets required in earning them. They also vary in effect for employment in terms of desirability by employers, level of compensation, and career advancement opportunities. The WE&T Needs Assessment categorized credentials as follows:[48]

- **Professional licenses –** indicates competency that is legally required to practice in certain professions, such as professional engineer (P.E.) or electrician.
- **Occupational certifications –** indicates competency that is voluntary, such as North American Technician Excellence (NATE) in HVAC.
- **Journey card –** certifies completion of the apprenticeship training program in a specific trade.
- **Educational degrees –** indicates meeting requirements for accredited educational program, such as an associate's degree or a bachelor's degree.
- **Educational certificates –** indicates completion of requirements for educational program, but not at the degree level.
- **Skills certificates –** indicates competency of a specific technical skills or safety practices.
- **Self-defined certificates –** indicates completion of training program.

CEWTP provided relatively short-term training, so the credentials earned were limited by the time frame of the program and skill sets acquired and are classified mainly as occupational certifications and skills certificates. The program offered the training leading up to taking a certification exam, but not all the subgrantees and subcontractors covered the fee associated with the certification; that is, the trainee was responsible for the fee for the certificate.

The SFP for EDD described a variety of certifications for which applicants for the Green Building Retraining program element could choose to provide training (beyond the required Certified Green Building Professional certification). Bonus selection points were awarded to proposals that included six or more industry-certified trainings.

As shown in Table 22, all EDD subgrantees provided training for at least one certification, and in Table 23, 11 of the 13 ETP subcontractors provided training for at least one certification.

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48 WE&T Needs Assessment, available from *http://www.irle.berkeley.edu/research/greeneconomy/* (accessed July 28, 2013).

Table 22: Number of EDD-Administered Training Programs Addressing Different Certifications

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing Different Certifications																				
			HERS, CalCERTS, and Related	Certified Green Building Professional (Build It Green)	Building Analyst Professional (BPI)	Envelope Professional (BPI)	HVAC/NATE-Heating and Cooling Pro	LMC Approved Weatherization	Building Performance Contractor (BPI)	LEED Associate	NABCEP Solar Thermal Installer	Title 24	Accredited Green Plumber	Certified Energy Auditor (AEE)	Certified PV Installer	Certified Solar Hot Water Installer	OSHA Certification	Work Readiness Certificate	Water/Energy Auditor	IECC/ASHRAE	PG&E Energy Specialist	Home Builders Institute Pre-Apprenticeship	CBPCA Solar Hot Water and Electricity
EDD Pre-Apprenticeship, Green Building	16	Hartnell College		•						•			•										
		Humboldt County									•				•								
		Imperial Valley College	•							•	•				•		•		•				
		Kern/Inyo/Mono Consortium											•		•								
		Los Angeles City	•							•								•					
		Long Beach CCD	•	•	•					•		•	•	•			•	•					
		Northern Rural Training and Employment Consortium	•	•						•	•				•	•							
		Peralta CCD	•		•						•										•		
		Richmond City	•	•	•						•												
		San Bernardino CCD	•					•	•			•											

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing Different Certifications																				
			HERS, CalCERTS, and Related	Certified Green Building Professional (Build It Green)	Building Analyst Professional (BPI)	Envelope Professional (BPI)	HVAC/NATE-Heating and Cooling Pro	LMC Approved Weatherization	Building Performance Contractor (BPI)	LEED Associate	NABCEP Solar Thermal Installer	Title 24	Accredited Green Plumber	Certified Energy Auditor (AEE)	Certified PV Installer	Certified Solar Hot Water Installer	OSHA Certification	Work Readiness Certificate	Water/Energy Auditor	IECC/ASHRAE	PG&E Energy Specialist	Home Builders Institute Pre-Apprenticeship	CBPCA Solar Hot Water and Electricity
		San Diego Workforce Partnership	•		•	•	•								•								
		San Francisco									•						•						
		Sacramento Employment Training Agency	•	•			•	•		•	•	•		•			•			•			
		San Luis Obispo County		•				•									•						
		Solano Community College	•															•					
		South Bay WIB		•								•		•								•	•
Number of EDD Pre-Apprenticeship – Green Building Training Programs Addressing Different Certifications			10	7	4	1	2	3	1	6	7	4	3	3	5	1	5	3	1	1	1	1	1
EDD Pre-Apprenticeship, Clean Energy	2	College of the Desert									•												
		Los Angeles Trade Technical College	•		•						•			•									

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing Different Certifications																					
			HERS, CalCERTS, and Related	Certified Green Building Professional (Build It Green)	Building Analyst Professional (BPI)	Envelope Professional (BPI)	HVAC/NATE-Heating and Cooling Pro	LMC Approved Weatherization	Building Performance Contractor (BPI)	LEED Associate	NABCEP Solar Thermal Installer	Title 24	Accredited Green Plumber	Certified Energy Auditor (AEE)	Certified PV Installer	Certified Solar Hot Water Installer	OSHA Certification	Work Readiness Certificate	Water/Energy Auditor	IECC/ASHRAE	PG&E Energy Specialist	Home Builders Institute Pre-Apprenticeship	CBPCA Solar Hot Water and Electricity
Number of EDD Pre-Apprenticeship – Clean Energy Training Programs Addressing Different Certifications			1	0	1	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0
EDD Retraining, Green Building	9	Contra Costa CCD	•	•	•	•	•	•		•		•		•		•	•		•					
		Grossmont-Cuyamaca CCD	•	•	•	•						•				•								
		Humboldt County		•	•									•		•	•							
		Long Beach CCD	•	•	•						•		•	•	•					•				
		Los Angeles County	•	•	•	•	•		•		•	•	•	•	•									
		Northern Rural Training and Employment Consortium	•	•			•				•	•				•	•							
		North Orange County CCD	•	•	•	•			•				•	•	•				•					
		Sacramento Employment Training Agency	•	•								•	•	•	•		•			•				

EDD Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing Different Certifications																				
			HERS, CalCERTS, and Related	Certified Green Building Professional (Build It Green)	Building Analyst Professional (BPI)	Envelope Professional (BPI)	HVAC/NATE-Heating and Cooling Pro	LMC Approved Weatherization	Building Performance Contractor (BPI)	LEED Associate	NABCEP Solar Thermal Installer	Title 24	Accredited Green Plumber	Certified Energy Auditor (AEE)	Certified PV Installer	Certified Solar Hot Water Installer	OSHA Certification	Work Readiness Certificate	Water/Energy Auditor	IECC/ASHRAE	PG&E Energy Specialist	Home Builders Institute Pre-Apprenticeship	CBPCA Solar Hot Water and Electricity
		Sonoma County	•	•	•								•	•	•		•				•	•	•
Number of EDD Retraining – Green Building Training Programs Addressing Different Certifications			8	9	7	4	3	1	2	1	3	5	5	7	5	4	5	0	2	2	1	1	1
EDD Retraining, Clean Energy	1	Kern CCD										•	•					•					
Number of EDD Retraining – Clean Energy Training Programs Addressing Different Certifications			0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0
Number of EDD Training Programs Addressing Different Certifications			**19**	**16**	**12**	**5**	**5**	**4**	**3**	**7**	**12**	**10**	**9**	**11**	**10**	**5**	**10**	**4**	**3**	**3**	**2**	**2**	**2**

* ASHRAE = American Society of Heating, Refrigerating and Air-Conditioning Engineers
* AEE = Association of Energy Engineers
* BPI = Building Performance Institute
* CalCERTS = California Certified Energy Rating and Testing Services
* HERS = Home Energy Rating System
* IECC = International Energy Conservation Code
* LEED = Leadership in Energy and Environmental Design
* LMC = Low/Moderate Limited Clientele
* OSHA = Occupational Safety and Health Administration
* PG&E = Pacific Gas and Electric Company

Source: EDD proposals and agreements

Table 23: Number of ETP-Administered Training Programs Addressing Different Certifications

ETP Program Element	Total Number of Training Programs by Program Element	Training Program Implementer	Number of Training Programs Addressing Different Certifications												
			HERS, CalCERTS, and Related	Certified Green Building Professional (Build It Green)	Building Analyst Professional (BPI)	Envelope Professional (BPI)	LEED Associate	Certified Commissioning Professional	NABCEP Solar Thermal Installer	Title 24	Accredited Green Plumber	Work Readiness Certificate	IEEC/ASHRAE	State of California Certification (Lighting Design/Code)	Title 20
ETP Career Advancement	13	CA Labor Federation AFL-CIO	•	•			•			•		•			
		Cal & Nevada Labor Management Cooperation Trust	•				•			•			•	•	•
		California Building Performance Contractors Association	•		•	•	•			•					
		Chabot-Las Positas CCD	•		•	•	•								
		Efficiency First, Inc.	•		•	•	•								
		Farmworker Institute of Education and Leadership Development							•						
		Home Energy Systems							•						
		Mendocino Solar Service										•			
		Northern California Solar Energy Association, Inc.							Ten-tative						
		ONNI, Inc. dba GreenPlumbers®USA					•	•							
		Plumbing & Piping Industry (Apprentice & Journeymen Training Trust Fund Of The Southern California)									•	•			
		Santa Monica CCD							•						
		Shasta Tehama Trinity Joint CCD							Ten-tative						
Number of ETP Career Advancement Training Programs Addressing Different Certifications			**5**	**1**	**3**	**3**	**6**	**1**	**3**	**3**	**1**	**3**	**1**	**1**	**1**

Source: ETP proposals and agreements

Other ARRA-funded programs, such as the California Comprehensive Residential Retrofit (CCRR) Program, required contractors attain certifications such those available through BPI and required surveyors and auditors to be certified HERS II raters. The most common BPI certifications obtained by CCRR program contractors included the Building Analyst Professional and Building Envelop Professional. The following is a list of the specific requirements for several of the CCRR program components:

- **Retrofit Bay Area Program.** Delivered retrofits to single and multifamily homes in eight Bay Area counties, and established contractor scholarships to become Home Energy Rating System Phase II raters and for Building Performance Institute training.
- **Affordable Multifamily Initiative**. Created a revolving loan fund for energy efficiency and water conservation improvements in Bay Area affordable multifamily projects, and established contractor scholarships to become Home Energy Rating System Phase II raters and for Building Performance Institute training.
- **Moderate Income Sustainable Technology Program.** Delivered financing for deep whole-house energy efficiency measures in 31 counties throughout the state, and required Home Energy Rating System Phase II ratings and documentation for all loans.
- **Sacramento Municipal Utility District Home Performance Program**. Delivered Home Energy Rating System Phase II ratings and home performance retrofits to single-family and multifamily owners in the utility's service area.
- **Energy Upgrade in San Diego.** Delivered comprehensive single-family and multifamily residential building retrofits in the San Diego region, provided training for home performance contractors and Home Energy Rating System Phase II raters, and expanded upon and piloted the Home Energy Rating System Phase II audit tool for use in multifamily buildings.
- **Fresno Regional Comprehensive Residential Retrofit Program.** Delivered no-cost Home Energy Rating System Phase II ratings, training, and support to develop a workforce for whole-house retrofits.
- **Retrofit Los Angeles Program.** Delivered financing options for single-family and multifamily retrofits, such as residential loan loss reserve financing, residential interest rate buy down reserve financing, multifamily loan loss reserve financing, and established contractor scholarships for BPI training.

This alignment across and within Energy Commission programs helped ensure that the knowledge and skills acquired during training would be required in the clean energy workforce.

CHAPTER 5:
Program Accomplishments

A primary objective of this evaluation was to assess the effectiveness of CEWTP in achieving its goals. Presented in this chapter is an assessment of program targets relative to program achievements, such as number of individuals enrolled in and completing CEWTP training, the number of certifications obtained by trainees, the number of jobs that trainees were placed into, and the number of trainees who were retained in their existing jobs.

The CEWTP evaluation assessed the achievement of program goals using documentation provided by the Energy Commission, as well as from EDD and ETP. As required by their respective interagency agreements with the Energy Commission, EDD and ETP submitted final reports that summarized performance metrics for CEWTP activities.

The *EDD Final Report*[49] provided a summary for each subgrantee that included the training goal, the actual number of trainees enrolled in and completed training, the number of certificates or degrees attained by trainees, and the number of trainees placed in jobs.

The *ETP Final Report*[50] summarized the number of trainees placed for the ETP Career Advancement program element overall. ETP subcontract agreements contained information on the enrollment, training and retention goals, and additional documentation provided by ETP that included the actual accomplishments.[51]

Number of Trainees Enrolled and Number Completing Training

Overall, 9,247 individuals enrolled in at least one of the CEWTP training activities, which was 116 percent of the enrollment goal. A total of 7,438 individuals completed at least one of the training activities in which they were enrolled, which was 101 percent of the goal. As shown in Table 24**,** for the most part, these accomplishments exceeded the specific targets established by the subgrantees and subcontractors for their respective programs. For example, with 2,849 participants enrolled, EDD Pre-Apprenticeship subgrantees achieved 103 percent of their enrollment goals. Similarly, with 2,579 participants completing training activities, these subgrantees achieved 104 percent of their training completion goals. EDD Retraining subgrantees achieved 104 percent of their enrollment goals and 108 percent of their training completion goals. ETP Career Advancement subcontractors achieved 136 percent of their enrollment goals and 97 percent of their training completion goals.

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49 *Final Report for the California Clean Energy Workforce Training Program*, April 13, 2012, available from http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/CA_Clean_Energy_Wrkfc_Training_Program-Final_Report_2012-04-13.pdf (accessed 7/28/2013).

50 Ibid.

51 ETP staff provided the ETP final invoice determination to the evaluators in April 2012.

A few individuals who were targeted for and/or enrolled in the OJT program element were transferred to another training program (funded through the WIA), and, as a result, goals for this EDD program element were not met.

Table 24: Summary of CEWTP Enrollment and Completed Training Goals and Accomplishments

Admin-istrator	Program Element (Number of Subgrantees or Subcontractors)		Number of Trainees Enrolled (Goal)	Number of Trainees Enrolled (Achieved)	Percent of Trainees Enrolled (Achieved/ Goal)	Number of Trainees Completed (Goal)	Number of Trainees Completed (Achieved)	Percent of Trainees Completed (Achieved/ Goal)
EDD[1]	Pre-Appren-ticeship	Green Building (16)	2,505	2,555	102%	2,233	2,301	103%
		Clean Energy (2)	270	294	109%	236	278	118%
		Pre-Apprenticeship Total (18)	2,775	2,849	103%	2,469	2,579	104%
	Re-training	Green Building (9)	1,562	1,666	107%	1,280	1,403	110%
		Clean Energy (1)	260	232	89%	234	228	97%
		Retraining Total (10)	1,822	1,898	104%	1,514	1,631	108%
	OJT (4)		143	78	55%	143	62[2]	43%
	EDD Total (32)		4,740	4,825	102%	4,126	4,272	104%
ETP[3]	Career Advancement (13)		3,255	4,422	136%	3,255	3,166	97%
Clean Energy Workforce Training Program (45)			**7,995**	**9,247**	**116%**	**7,381**	**7,438**	**101%**

[1] EDD data extracted from *Final Report for the California Clean Energy Workforce Training Program*, April 13, 2012, available from http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/CA_Clean_Energy_Wrkfc_Training_Program-Final_Report_2012-04-13.pdf (accessed 7/28/2013).

[2] 16 participants in the OJT component were transferred to another WIA funding source to continue training.

[3] ETP goals extracted from subcontracts, accomplishments extracted from the ETP Final Invoice determination, which was provided by ETP staff to the evaluators in April 2012.

Source: DNV KEMA

Another way of assessing CEWTP effectiveness is to compare the number of participants who completed training to the number enrolled. As shown in Table 25, about 80 percent of the participants who had enrolled in a CEWTP training activity actually completed it. This percentage varies by program element, with EDD subgrantees retaining 89 percent of the initial enrollees, and ETP subcontractors retaining 72 percent of the initial enrollees.

Table 25: CEWTP Enrollment as a Percentage of Completed Training

Admin-istrator	Program Element (Number of Subgrantees or Subcontractors)		Number of Trainees Enrolled (Achieved)	Number of Trainees Completed (Achieved)	Percent of Trainees Completed (Completed/ Enrolled)
EDD[1]	Pre-Apprenticeship	Green Building (16)	2,555	2,301	90%
		Clean Energy (2)	294	278	95%
		Pre-Apprenticeship Total (18)	2,849	2,579	91%
	Retraining	Green Building (9)	1,666	1,403	84%
		Clean Energy (1)	232	228	98%
		Retraining Total (10)	1,898	1,631	86%
	OJT (4)		78	62	79%
	EDD Total (32)		4,825	4,272	89%
ETP[2]	Career Advancement (13)		4,422	3,166	72%
Clean Energy Workforce Training Program Total (45)			**9,247**	**7,438**	**80%**

[1] EDD data extracted from *Final Report for the California Clean Energy Workforce Training Program*, April 13, 2012, available from http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/CA_Clean_Energy_Wrkfc_Training_Program-Final_Report_2012-04-13.pdf (accessed 7/28/2013).

[2] ETP goals extracted from subcontracts, accomplishments extracted from the ETP Final Invoice determination, which was provided by ETP staff to the evaluators in April 2012.

Source: DNV KEMA

Table 26 displays the enrollment and completed training results for each EDD subgrantee and ETP subcontractor. As shown, the average number of training participants per subgrantee or subcontractor ranged between 100 and 150 participants. One exception is the ETP Career Advancement subcontractor, California Labor Federation, AFL-CIO, which trained more than 1,700 people. This subcontractor accounted for more than 50 percent of the total training participants within the ETP Career Advancement program element. Within the EDD Pre-Apprenticeship Green Building program element, four subgrantees were responsible for training about 50 percent of the total number of participants: Los Angeles City, Richmond City, Sacramento Employment Training Agency, and Solano Community College. In addition, 19 of the 45 total subgrantees and subcontractors were highly effective in that 90 percent or more of the original enrollees actually completed the full training program.

Table 26: CEWTP Enrollment and Completed Training Goals and Accomplishments by EDD Subgrantee and ETP Subcontractor

Admin-istrator	Program Element	Training Program Implementer	Number of Trainees Enrolled (Goal)	Number of Trainees Enrolled (Achieved)	Percent of Trainees Enrolled (Achieved/ Goal)	Number of Trainees Completed (Goal)	Number of Trainees Completed (Achieved)	Percent of Trainees Completed (Achieved/ Goal)	Percent of Trainees Completed (Completed/ Enrolled)
EDD[1]	Pre-Apprentice-ship, Green Building	Hartnell College	140	190	136%	133	166	125%	87%
		Humboldt County	100	86	86%	80	72	90%	84%
		Imperial Valley College	30	29	97%	22	29	132%	100%
		Kern/Inyo/Mono Consortium	120	107	89%	96	103	107%	96%
		Long Beach CCD	100	91	91%	100	72	72%	79%
		Los Angeles City	200	239	120%	160	239	149%	100%
		Northern Rural Training and Employment Consortium	117	142	121%	95	118	124%	83%
		Peralta CCD	120	133	111%	100	89	89%	67%
		Richmond City	255	224	88%	255	196	77%	88%
		Sacramento Employment Training Agency	230	232	101%	230	220	96%	95%
		San Bernardino CCD	180	184	102%	144	159	110%	86%
		San Diego Workforce Partnership	160	162	101%	128	137	107%	85%
		San Francisco	150	85	57%	128	78	61%	92%
		San Luis Obispo County	133	126	95%	126	107	85%	85%
		Solano Community College	400	461	115%	400	461	115%	100%
		South Bay WIB	70	64	91%	56	55	98%	86%
	EDD Pre-Apprenticeship, Green Building Total		2,505	2,555	102%	2,253	2,301	103%	90%
	Pre-Apprentice-ship, Clean Energy	College of the Desert	120	117	98%	108	117	108%	100%
		Los Angeles Trade Technical College	150	177	118%	128	161	126%	91%
	EDD Pre-Apprenticeship, Clean Energy Total		270	294	109%	236	278	118%	95%
	Retraining,	Contra Costa CCD	180	231	128%	145	199	137%	86%

Admin-istrator	Program Element	Training Program Implementer	Number of Trainees Enrolled (Goal)	Number of Trainees Enrolled (Achieved)	Percent of Trainees Enrolled (Achieved/ Goal)	Number of Trainees Completed (Goal)	Number of Trainees Completed (Achieved)	Percent of Trainees Completed (Achieved/ Goal)	Percent of Trainees Completed (Completed/ Enrolled)
EDD[1]	Green Building	Grossmont-Cuyamaca CCD	240	251	105%	192	223	116%	89%
		Humboldt County	100	94	94%	80	90	113%	96%
		Long Beach CCD	125	129	103%	100	116	116%	90%
		Los Angeles County	150	150	100%	128	150	117%	100%
		Northern Rural Training and Employment Consortium	117	135	115%	95	101	106%	75%
		North Orange County CCD	150	127	85%	140	108	77%	85%
		Sacramento Employment Training Agency	200	271	136%	160	168	105%	62%
		Sonoma County	300	278	93%	240	248	103%	89%
	EDD Retraining, Green Building Total		1,562	1,666	107%	1,280	1,403	110%	84%
	Retraining, Clean Energy	Kern CCD	260	232	89%	234	228	97%	98%
	EDD Retraining, Clean Energy Total		260	232	89%	234	228	97%	98%
	OJT	Northern Rural Training and Employment Consortium	30	26	87%	30	10	33%	38%
		Peralta CCD	25	3	12%	25	3	12%	100%
		Richmond City	45	19	42%	45	19	42%	100%
		Sacramento Employment Training Agency	43	30	70%	43	30	70%	100%
	EDD OJT, Total		143	78	55%	143	62	43%	79%
EDD Total			**4,740**	**4,825**	**102%**	**4,146**	**4,272**	**104%**	**89%**
ETP[2]	Career Advancement	CA Labor Federation AFL-CIO	847	2,643	312%	847	1,765	208%	67%
		Cal & Nevada Labor Management Cooperation Trust	295	361	122%	295	293	99%	81%
		California Building Performance Contractors Association	200	330	165%	200	202	101%	61%

Admin-istrator	Program Element	Training Program Implementer	Number of Trainees Enrolled (Goal)	Number of Trainees Enrolled (Achieved)	Percent of Trainees Enrolled (Achieved/ Goal)	Number of Trainees Completed (Goal)	Number of Trainees Completed (Achieved)	Percent of Trainees Completed (Achieved/ Goal)	Percent of Trainees Completed (Completed/ Enrolled)
ETP[2]	Career Advancement	Chabot-Las Positas CCD	91	60	66%	91	57	63%	95%
		Efficiency First, Inc.	218	163	75%	218	105	48%	64%
		Farmworker Institute of Education and Leadership Development	109	134	123%	109	130	119%	97%
		Home Energy Systems	23	16	70%	23	6	26%	38%
		Mendocino Solar Service	7	5	71%	7	5	71%	100%
		Northern California Solar Energy Association, Inc.	127	37	29%	127	30	24%	81%
		ONNI, Inc. dba GreenPlumbers®USA	113	318	281%	113	303	268%	95%
		Plumbing & Piping Industry (Apprentice & Journeymen Training Trust Fund Of The Southern California)	800	76	10%	800	70	9%	92%
		Santa Monica CCD	362	218	60%	362	151	42%	69%
		Shasta Tehama Trinity Joint CCD	63	61	97%	63	49	78%	80%
	ETP Career Advancement, Total		3,255	4,422	136%	3,255	3,166	97%	72%
ETP Total			**3,255**	**4,422**	**136%**	**3,255**	**3,166**	**97%**	**72%**
CEWTP Total			**7,995**	**9,247**	**116%**	**7,381**	**7,438**	**101%**	**80%**

[1] EDD data extracted from *Final Report for the California Clean Energy Workforce Training Program*, April 13, 2012, available from http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/CA_Clean_Energy_Wrkfc_Training_Program-Final_Report_2012-04-13.pdf (accessed 7/28/2013).

[2] ETP goals extracted from subcontracts, accomplishments extracted from the ETP Final Invoice determination, which was provided by ETP staff to the evaluators in April 2012.

Source: DNV KEMA

Number of Certifications Attained by EDD Training Participants

As described in previous chapters, the EDD subgrantees and ETP subcontractors implemented a variety of training activities that would qualify a trainee to attain different types of industry-recognized certifications, and trainees were permitted to select the training appropriate to prepare them for the number and type of certifications that met their career aspirations. EDD subgrantees established targets for (and were required to track) the number of certifications they expected their trainees to earn.

As shown in Table 27, overall, EDD subgrantees expected that 3,177 participants who completed training would attain certifications. In total, EDD subgrantees achieved 112 percent of this target, with more than 3,500 certifications obtained by training participants. This result also represents about 84 percent of the more than 4,200 individuals who completed training administered by EDD. Results by each EDD subgrantee are presented in Table 28. As shown, 18 of the 28 subgrantees exceeded their certifications goal.

While ETP preferred training that leads directly to a certificate of competency, ETP subcontractors did not have explicit goals pertaining to certifications and, consequently, were not required to track this information.

Table 27: Summary of EDD Certification Goals and Accomplishments

Program Element (Number of Subgrantees)		Number of Trainees Completed (Achieved)	Number of Certifications Attained (Goal)	Number of Certifications Attained (Achieved)	Percent of Certifications Attained (Achieved/ Goal)	Percent of Trainees Attaining Certifications (Achieved)
EDD Pre-Appren-ticeship[1]	Green Building (16)	2,301	1,640	1,528	93%	66%
	Clean Energy (2)	278	193	251	130%	90%
	Pre-Appren-ticeship Total (18)	2,579	1,833	1,779	97%	69%
EDD Re-training[1]	Green Building (9)	1,403	1,110	1,545	139%	110%
	Clean Energy (1)	228	234	228	97%	100%
	Retraining Total (10)	1,631	1,344	1,773	132%	109%
EDD Total (28)[1]		**4,210**	**3,177**	**3,552**	**112%**	**84%**

[1] EDD data extracted from *Final Report for the California Clean Energy Workforce Training Program*, April 13, 2012, available from http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/CA_Clean_Energy_Wrkfc_Training_Program-Final_Report_2012-04-13.pdf (accessed 7/28/2013).

Source: DNV KEMA

Table 28: EDD Certification Goals and Accomplishments by Subgrantee

Program Element	Training Program Implementer	Number of Trainees Completed (Achieved)	Number of Certifications Attained (Goal)	Number of Certifications Attained (Achieved)	Percent of Certifications Attained (Achieved/ Goal)	Percent of Trainees Attaining Certifications (Achieved)
EDD Pre-Apprenticeship, Green Building[1]	Hartnell College	166	N/A[1]	N/A[1]	N/A[2]	N/A[2]
	Humboldt County	72	70	72	103%	100%
	Imperial Valley College	29	22	29	132%	100%
	Kern/Inyo/Mono Consortium	103	96	103	107%	100%
	Long Beach CCD	72	96	70	73%	97%
	Los Angeles City	239	140	239	171%	100%
	Northern Rural Training and Employment Consortium	118	82	118	144%	100%
	Peralta CCD	89	100	89	89%	100%
	Richmond City	196	110	182	165%	93%
	Sacramento Employment Training Agency	220	161	165	102%	75%
	San Bernardino CCD	159	101	159	157%	100%
	San Diego Workforce Partnership	137	112	116	104%	85%
	San Francisco	78	128	78	61%	100%
	San Luis Obispo County	107	93	48	52%	45%
	Solano Community College	461	280	N/A	N/A	N/A
	South Bay WIB	55	49	60	122%	109%
EDD Pre-Apprenticeship, Green Building Total		2,301	1,640	1,528	93%[1]	66%[1]
EDD Pre-Apprenticeship, Clean Energy[1]	College of the Desert	117	95	90	95%	77%
	Los Angeles Trade Technical College	161	98	161	164%	100%
EDD Pre-Apprenticeship, Clean Energy Total		278	193	251	130%	90%

Program Element	Training Program Implementer	Number of Trainees Completed (Achieved)	Number of Certifications Attained (Goal)	Number of Certifications Attained (Achieved)	Percent of Certifications Attained (Achieved/ Goal)	Percent of Trainees Attaining Certifications (Achieved)
EDD Retraining, Green Building[1]	Contra Costa CCD	199	127	188	148%	94%
	Grossmont-Cuyamaca CCD	223	168	532	317%	239%
	Humboldt County	90	70	90	129%	100%
	Long Beach CCD	116	88	93	106%	80%
	Los Angeles County	150	113	71	63%	47%
	Northern Rural Training and Employment Consortium	101	82	101	123%	100%
	North Orange County CCD	108	110	108	98%	100%
	Sacramento Employment Training Agency	168	142	145	102%	86%
	Sonoma County	248	210	217	103%	88%
EDD Retraining, Green Building Total		1,403	1,110	1,545	139%	110%
EDD Retraining, Clean Energy[1]	Kern CCD	228	234	228	97%	100%
EDD Retraining, Clean Energy Total		228	234	228	97%	100%
EDD Total		**4,210**	**3,177**	**3,552**	**112%[3]**	**83%[3]**

* N/A – not available

[1] EDD data extracted from *Final Report for the California Clean Energy Workforce Training Program*, April 13, 2012, available from http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/CA_Clean_Energy_Wrkfc_Training_Program-Final_Report_2012-04-13.pdf (accessed 7/28/2013).

[2] Hartnell College had not negotiated a performance goal for certifications attained as part of their subgrant agreement and did not report the number of certifications attained.

[3] These percentages are calculated excluding Hartnell College and Solano Community College as these results were missing for these two subgrantees.

Sources: DNV KEMA

EDD Employment Placements

Another goal of the EDD training activities was to achieve certain employment placement targets. As shown in Table 29, specific targets were established for both unsubsidized jobs and training-related jobs consistent with the state's WIA performance goals, which were negotiated with the federal Department of Labor. *Unsubsidized jobs* refer to jobs for which wages are paid directly by the employer and not subsidized through any government program. Training-related jobs refer to those that use a substantial portion of the skills taught in the training received by the individual. Training-related jobs are reported as a subset of unsubsidized jobs. Information on the number of training participants who were placed in subsidized jobs was not available from program documents.

Overall, about 1,900 participants were placed in unsubsidized jobs, and about 1,100 were placed in training-related jobs. This equates to about 58 percent of the goal for unsubsidized jobs and 61 percent of the goal for training-related jobs.

The demand for trained workers during the 2009-2011 time frame was lower than expected for a number of reasons, including:

- **Lagging economy and high unemployment –** The economy was cited as a prime reason for the lack of jobs, specifically the construction industry lagging due to the economic downturn.
- **Cancelling of key federal programs –** Federal programs such as the Property Assessed Clean Energy (PACE) financing never kicked off, resulting in significantly fewer jobs than anticipated.
- **Lack of supportive legislation –** Legislation expected to support the green economy did not materialize, and, as a result, businesses were reluctant to expand and homeowners lacked incentives to invest in energy efficiency.
- **Uncertainty in clean energy markets –** Uncertainty with regard to regulatory processes and utility rebate program incentives were cited as factors leading to slower-than-expected installations of both utility-scale and customer-sited clean energy projects.

These factors combined to cause reductions in the demand for trained workers as compared to what was anticipated when the CEWTP was being initiated. That said, 45 percent of all 4,210 EDD training participants were placed in unsubsidized jobs, and 27 percent were placed in training-related jobs. This equates to placing roughly one of every two individuals who completed EDD training in unsubsidized jobs, and placing about one of every four individuals in training-related jobs. This is an impressive result, particularly in light of the weak economy and unanticipated lack of demand for clean energy workers.

Table 29: Summary of EDD Employment Placement Goals and Accomplishments

Program Element (Number of Subgrantees)		Number of Trainees Completed (Achieved)	Number of Trainees Placed in Un-subsidized Jobs (Goal)	Number of Trainees Placed in Un-subsidized Jobs (Achieved)	Percent of Un-subsidized Jobs (Achieved/ Goal)	Percent of Trainees Obtaining Un-subsidized Jobs (Achieved)	Number of Trainees Placed in Training-Related Jobs (Goal)	Number of Trainees Placed in Training-Related Jobs (Achieved)	Percent of Training-Related Jobs (Achieved/ Goal)	Percent of Trainees Obtaining Training-Related Jobs (Achieved)
EDD Pre-Apprentice-ship[1]	Green Building (16)	2,301	1,763	1,050	60%	46%	940	698	74%	30%
	Clean Energy (2)	278	201	143	71%	51%	85	113	133%	41%
	Pre-Apprentice-ship Total (18)	2,579	1,964	1,193	61%	46%	1,025	811	79%	31%
EDD Re-training[1]	Green Building (9)	1,403	1,094	664	61%	47%	856	330	39%	24%
	Clean Energy (1)	228	217	32	15%	14%	N/A	N/A	N/A	N/A
	Retraining Total (10)	1,631	1,311	696	53%	43%	856	330	39%	20%
EDD Total (28)[1]		**4,210**	**3,275**	**1,889**	**58%**	**45%**	**1,881**	**1,141**	**61%**	**27%**

[1] EDD data extracted from *Final Report for the California Clean Energy Workforce Training Program*, April 13, 2012, available from http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/CA_Clean_Energy_Wrkfc_Training_Program-Final_Report_2012-04-13.pdf (accessed 7/28/2013).

Source: DNV KEMA

ETP Employee Retention

Individuals who participated in the ETP Career Advancement element were required, by definition, to be employed for a specified period following the training. As discussed in Chapter 2, the standard core program retention requirement for ETP trainees being placed and retained in full-time employment was 90 consecutive days with one employer. Alternative patterns for placement and retention were also available. According to ETP documentation, the nearly 3,200 participants who completed training were retained in employment positions for at least the contractually required minimum time frame. While new jobs may not have been created or attained for these participants, all of them received upgraded skills in the following areas:

- Jobs that reduce energy use or water use in the building trades, such as retrofitting, green plumbing, and efficient lighting manufacturing
- Jobs that produce or transmit renewable energy, such as solar panel manufacturing and smart grid installation

CHAPTER 6:
Implementer and Employer Perspectives

As discussed in Chapter 3, the CEWTP evaluation relied heavily on primary data collected through in-depth interviews with key program players, including program administrators, subgrantees, subcontractors, monitoring staff (regional analysts and regional advisors), and employers who have hired a CEWTP trainee. Table 32 summarizes the number of interviews completed for each category of respondent.

Table 30: Summary of In-Depth Interviews Completed

Program Elements	Respondent Type	Completed
EDD Pre-Apprenticeship and Retraining	Program Administrator	1
	Regional Advisor	6
	Subgrantee	10
	Employer	5
	Total	**22**
ETP Career Advancement	Program Administrator	1
	Regional Analyst	3
	Subcontractor	6
	Total	**10**

Source: DNV KEMA

These interviews covered a broad range of topics designed to address program design and implementation effectiveness. These topics centered on some key elements or themes:

- Collaborative efforts to design training
- Projecting employment opportunities
- Changing labor markets and effect on demand for trained workers
- Employer outreach and job placement
- Training characteristics, such as certifications, hands-on training, basic/ancillary skills, and sales/marketing skills
- Program administration, such as effectiveness of recruitment and retention, program adaptation and relevancy, design and delivery effectiveness, and reasonableness of program requirements

The following sections present a detailed discussion of the perspectives expressed regarding each of these topics. Presented first are the relevant results for the EDD program elements, including perspectives from employers who had relationships with EDD subgrantees. The next

section presents relevant results for the ETP program elements. The final section presents a combined set of results related to program sustainability.

EDD Subgrantee and Employer Perspectives

Collaborative Efforts to Design Training

CEWTP supported the use of sector strategies to engage industry sector employers or representative industry and professional associations during the planning stages of the program to ensure that the training provided would meet the needs of the local labor market.

All EDD subgrantees were required to work closely with local clean energy workforce advisory groups and to engage potential employers in developing the training curriculum. EDD subgrantees represented partnerships between local community colleges and WIBs, who leveraged existing relationships with the local workforce and employers, and were positioned to provide trainee screening and recruiting services. In many cases, EDD subgrantees benefited from experienced workforce agencies in terms of instructor hiring, recruiting practices, and curriculum design. WIBs were also valued for their long-standing relationships with local employers.

In addition, advisory councils were formed from representatives of industry partners, such as local employers, trade unions, industry nonprofit organizations, utilities, and private and public training providers. Many EDD subgrantees relied heavily on advisory councils to help design training curriculum and took into consideration best practices, employer needs, hiring requirements, daily work requirements, and upcoming construction projects. Creating close working relationships with community colleges, WIBs, and employers ensured that the training offered directly matched workforce needs.

> *"Community colleges are generally behind what the industry wants, depending on the industry and how closely they work with the industry. Colleges involved industry people to find out employer needs. Green councils gave them advice so that the training facility could develop a class that would address employer needs, so that students not only have the theory, but also practical skills." – EDD Regional Analyst*

Utility representatives on the advisory councils also provided curriculum input in terms of upcoming projects and estimates of the workers needed for these projects. In addition, the utilities identified the prerequisite skills and certifications needed for entry-level employment. Several EDD subgrantees were able to identify specific utility-scale projects and designed the training program and curriculum around those project needs.

> *"We had frequent communication with our green partnerships to make sure the program was headed in the right direction. PG&E provided us with a curriculum, and we talked to SCE (Southern California Edison), SoCal Gas (Southern California Gas Company), and SDG&E (San Diego Gas and Electric) to learn about their employment needs and to determine what training they valued in an entry-level worker. We also talked with utility-scale solar and wind companies*

to determine whether the proposed curriculum aligned with the necessary skill sets." – EDD Retraining Subgrantee

More than half of the EDD subgrantees interviewed stated that employers were involved from the beginning to design curriculum that would be of greatest use.

"We had contacts with construction industry through Builders Exchange and a focus on business services, which is the idea that keeping businesses healthy allows job seekers to find jobs. We built relationships over years with employers, potential for posttraining employment"—EDD Pre-Apprenticeship and Retraining Subgrantee

Projecting Employment Opportunities

An inherent challenge to designing effective training programs is the time lag between the time the program was designed and when the trainees actually completed the training. This becomes particularly challenging, as discussed above, when the training program is addressing workforce needs in an emerging industry such as clean energy during a time of economic uncertainty. Using a sector strategy approach not only helped focus the subgrantees and subcontractors on designing programs with content to address the needs of the labor market, but helped quantify the level of those needs.

Many of the EDD subgrantees' proposals provided local assessments of clean energy labor requirements, and some, especially programs proposing utility-scale renewable training, were able to point to specific projects to justify their programs. While the labor market projections proved overly optimistic, the subgrantees attempted to assess labor market needs based on secondary studies and primary data.

A few EDD subgrantees discussed their clean energy labor projections in WIA close-out reports and interviews.

"Before we wrote the grant, we did a lot of labor market studies in conjunction with our local utilities, employers, and WIBs. When we expected PACE to arrive, these studies projected solar as the area in the most need of a trained workforce. We also chose to focus on solar because our location is one of the top solar cities in the nation." – EDD Pre-Apprenticeship Subgrantee

"(Before the grant was written,) unemployment was at 5.1 percent. Environmental scan data from that time identified over 356 renewable energy firms and 1,135 energy efficiency firms in the region. It was reported that the eight primary energy efficiency occupations in the San Diego and Imperial regions were estimated to grow at a rate of 17 (percent) to 53 percent over the next three years and specifically expected an increase of over 2,600 jobs to be developed. Instead, what we saw was an increase in unemployment to 10.2 percent in March 2011." – EDD Retraining Subgrantee

"Lagging labor market information is another contributing factor to the lack of understanding of the skills and certification needed in this emerging industry. Despite efforts to provide data as accurate as possible to program participants, actual labor information was mismatched with independent studies and industry scans. Thus, reliable data could not be made available." – EDD Pre-Apprenticeship and Retraining Subgrantee

Changing Labor Market Conditions and Effect on Demand for Trained Workers

As mentioned above, the demand for trained workers during the 2009-2011 time frame was lower than expected for a number of reasons, as described in this section.

Lagging Economy and High Unemployment

The economy was cited as a prime reason for the lack of jobs, specifically the construction industry lagging due to the economic downturn. In mid-2011, California's overall unemployment rate was 3 percentage points higher than the national rate. In addition, the supply of clean energy jobs by 2011 was suppressed by a suite of additional factors, including the rise in housing foreclosures, reduced lending to small businesses, and overall stagnation in economic activity.

These conditions undermined the immediate value of CEWTP, in that training was provided for jobs that were projected, but not realized.

> *"What's challenging about the green industry is that new jobs aren't being created, and until the private sector creates jobs, our trainees are sitting in limbo." – EDD Pre-Apprenticeship Subgrantee*

> *"The recession really impacted us because just as we were starting these grants, we hit the worst part of our unemployment. Electricians and unions say that the commercial construction they were expecting has not picked because banks are not lending money. The hiring of journey-level employees is starting to happen now but it's a lot slower than expected." – EDD Pre-Apprenticeship Subgrantee*

Lack of Demand from Key Federal Programs: HOME STAR and Property Assessed Clean Energy (PACE)

Weak demand for clean energy trainees was attributed in part to the cancellation of PACE programs,[52] delayed implementation of PACE programs, and the failure of Congress to enact legislation that would fund the federal HOME STAR program. When the CEWTP grant proposals were written, the work generated by these two programs was expected to provide the majority of jobs for trainees. The optimism surrounding these programs was high as President Obama held a press conference urging Congress to pass HOME STAR legislation, and PACE financing programs sprung up throughout the country. Ultimately, that optimism proved unfounded as Congress failed to enact HOME STAR legislation, and PACE financing programs were stalled by concerns of mortgage lenders.

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[52] With the Federal Housing Financing Agency (FHFA) decision to no longer allow PACE loans to be the first position for repayment in case of default before the primary lender, PACE programs throughout the United States were essentially cancelled. See FHFA ruling at http://www.gpo.gov/fdsys/pkg/FR-2012-06-15/pdf/2012-14724.pdf. Exceptions included locally backed financing programs, like the Sonoma County Energy Independence Program (SCEIP).

> *"Forecasted in the original SFP was the adoption and implementation of AB 811 PACE financing districts and federally supported HOME STAR incentive programs created to remove barriers to implementing efficiency upgrades to buildings. Grantees were urged to train as fast as possible to meet the workforce demand the two legislative efforts combined would have created. The failure to pass these initiatives has drastically altered the job placement outcomes of the training effort, hampered the growth of the industry, and caused mistrust in the program deliverable among stakeholders and participants." – EDD Pre-Apprenticeship and Retraining Subgrantee*

Even as early as mid- 2010, some CEWTP training providers questioned the initial assumptions of clean energy employment opportunities from PACE and HOME STAR. However, they were reluctant to make mid-program changes since the fate of these programs remained uncertain.

> *"When we wrote the grant, employers were expecting these programs to come through and they said they didn't have enough workers for the demand. So, we continued to build the training program around these needs because it hadn't yet become clear that these programs were dead, but just temporarily tied up in legislation." – EDD Pre-Apprenticeship and Retraining Subgrantee*

> *"The increase of unemployment in our region, coupled with the lack of legislation that was expected to be signed to support the green economy, resulted in no new jobs developed as was predicted. With the legislation to support the green economy going unsigned, firms were reluctant to expand, and homeowners had no incentive to make their homes more energy-efficient or to install solar devices."—EDD Retraining Subgrantee*

The lack of programs not only affected employment opportunities and placement, but trainee recruiting for some EDD subgrantees.

> *"Participants saw the delay of programs that would drive demand as a sign that there would be no future in green building jobs; therefore, they did not enroll in the expected numbers." – EDD Retraining Subgrantee*

In areas where PACE programs were implemented, conflicts with mortgage lenders were cited as factors influencing reduced demand for retrofit projects.

> *"The Sonoma County Energy Independence Program, one of the few PACE programs in the state, is still up and running, but due to conflict with mortgage lenders, demand for retrofit work financed through the program has dropped by 50 percent." – EDD Retraining Subgrantee*

Uncertainty in Clean Energy Markets

Uncertainty with regard to regulatory processes and utility rebate program incentives was also cited as a factor leading to slower-than-expected installations of both utility-scale and customer-sited clean energy projects.

For example, one of the two EDD subgrantees who focused on training related to utility-scale renewable energy projects reported difficulty placing trainees in jobs due to the lengthy implementation time frame.

"Since we wrote the grant application, our understanding of the job market has changed. Projects were approved, permitted, and constructed at a much slower pace than we had expected at the time the grant proposal was written. We anticipated job opportunities at the time of grant writing, and we based our program on a list of utility-scale wind and solar projects, but only 1 of the 15 projects we anticipated actually broke ground during the grant term. Some of them are expected to break ground in the near future, but it is a slower process than we anticipated."— EDD Retraining Subgrantee

All of these factors combined resulted in reductions in the demand for trained workers as compared to what was anticipated when CEWTP was initiated.

Employer Outreach and Job Placement

Despite the relatively weak economy and unanticipated lack of demand for clean energy workers as stated above, about one of every two individuals who completed training activities through the EDD Pre-Apprenticeship and Retraining program elements was placed in unsubsidized jobs, and about one of every four individuals was placed in training-related jobs. The resources and assistance provided through the WIB and community college partnerships were essential in achieving these results.

The partnerships used their established network of employer contacts and job search resources to place trainees in jobs. In some cases, the partnerships also helped create job opportunities. For example, at least one workforce agency had a staff member dedicated to job lead development, which included forging relationships with local employers and providing program trainees with information through e-mail or telephone calls.

"We had a job developer who worked on the project, which was the most effective. He had contacts in the business community throughout San Diego County with the utility companies and contractor associations. He was constantly working to promote our students after they had graduated and sending job leads to our students via e-mail." – EDD Retraining Subgrantee

Four of the five interviewed employers stated that trainees were recommended for employment by a program staff member or an instructor. One utility-scale solar employer developed personal relationships with program staff and used the EDD Pre-Apprenticeship element as a hiring pipeline for new employees.

"The two interns we hired were hand-picked by the teacher. I think he picked the most energetic and curious students that were very interested, wanted to learn, and already had basic knowledge. It definitely weighs more in their advantage that they took that class for us. They asked lots of questions and understood the basic technology." – Solar/Energy Services Industry Employer

"I saw he took the time to go through the training program and that made my decision to hire him. He showed knowledge about the penetrations, HVAC systems, insulation, and proper techniques that he learned through the training program. He was very eager and wanted to learn." – Residential Energy Services Industry Employer

Despite these efforts to conduct employer outreach and job placement services, the weak demand for clean energy jobs and a slow economy remained a significant challenge throughout the funding term for many subgrantees and subcontractors. The effectiveness of job lead development was at times challenged by a perceived lack of initiative among trainees.

> *"A lot of the students don't use the resources, don't complete the applications." – EDD Pre-Apprenticeship Subgrantee*

> *"The students weren't following through on the job leads and weren't returning the job developer's phone calls. There were a few reasons for this reaction: some trainees were discouraged because the jobs offered did not meet their expectations, some trainees decided to search in a different direction for a job, and others moved away because of the economy." – EDD Retraining Subgrantee*

Training Characteristics

The CEWTP training elements were designed and implemented to meet industry and employer needs and to further individual trainees on their career paths. This diverse set of objectives required a wide range of offered skills training. Outreach and collaboration with employers and industry partners were an important part of designing the curriculum and determining what skills and certifications were offered by the training.

Certifications

Another goal of CEWTP was to promote the development and adoption of third-party accredited certification programs and to equip the clean energy workforce with portable and stackable credentials and certifications. In addition to helping with recruitment, retention, and job placement, these certifications increased the likelihood of the sustained participation of trainees in the clean energy industry. As reported above, more than 3,500 industry-recognized certifications were attained because of the training.

The interviews and surveys provided a few insights into whether the certifications align with industry need. For example, two of the five employers interviewed said that as a condition for employment, they look for BPI, HERS, OSHA, Title 24, and EPA lead abatement certifications.

> *"If a potential employee had OSHA or BPI certification, it would certainly influence the decision to hire them." – EDD Pre-Apprenticeship Subgrantee*

Hands-On Training

Most training curricula were based upon a two-pronged strategy: the first element was classroom-based education; the second was hands-on training. Hands-on training typically involved a lab component that focused on a specific task or activity, such as solar panel assembly or OJT. For EDD-administered training programs, OJT was provided by either subsidized employment offered on a temporary basis or field opportunities made possible directly through the training program.

The employers interviewed as part of this evaluation did not value a theoretical knowledge background nearly as much as they valued practical, hands-on, and field experience. The value of OJT derives from the belief that certain key construction skills can be acquired only on the

job. Being able to handle oneself on a construction site and perform tasks in the fewest steps possible are skill sets that employers value. All five of the employers interviewed echoed this sentiment in one form or another.

> *"There's nothing like doing it to learn it. A training course in which people are learning the installation and safety makes them more valuable."—Solar Industry Employer*

Some employers said they would be willing to overlook a lack of experience if the candidate demonstrated a willingness and ability to learn. Individuals who have completed hands-on training and certification programs may be more likely hired.

> *"I look for someone who has at least some construction background and understands the components of the home. HERS raters should have good documentation skills, be fluent and direct, and have Excel program skills. If they do not have it, they can be taught, but it is a lot easier to do a transition than try to teach somebody who has never done anything like that… A certification of completion of a training program shows me that at least they're exposed to it." – Residential Energy Services Industry Employer*

Employers who had hired trainees from the EDD Pre-Apprenticeship and Retraining program elements stated that their new hires had acquired the skills and knowledge necessary for employment. Additionally, three of the employers interviewed stated that hands-on training was important in their decision to hire.

> *"The training gives people a good foundation and knowledge base. The program gives workers a good hands-on and technical knowledge so that when they come onto a site, they have a better understanding and can come up to speed much more quickly. Trainees also tend to be more passionate about what they're doing and an interest in renewable energy and that comes through in the work that they're doing."—Solar Industry Employer*

While all EDD subgrantees interviewed recognized the importance of hands-on training, there was variation in the proportion of hands-on to classroom training preferred.

> *"Some of these students haven't been in school for decades, so lecture-and–book format learning is not the way for our client population to learn. They are more receptive to visual and kinetic learning, so our students are wiring a solar panel minutes after they finish the chapter in the book." – EDD Pre-Apprenticeship Subgrantee*

> *"The hands-on training is not critical, but it's helpful, and the experience that trainees gain will serve them on our projects and others. Our hires are being used for postinstallation work (posttilts, racks, module support system), so it's helpful if they have general knowledge of the solar installation process." – Solar Industry Employer*

On the other hand, even if employers are comfortable hiring a candidate without work experience, they do want to see some capacity of hands-on ability in employment candidates.

> *"I can't expect too much out of high school or college candidates, especially because this is a fairly new industry. I consider people with construction experience and expect them to know how to use*

a screwdriver and hammer. I look for hands-on experience with the systems themselves: PV systems, thermal systems." – Solar/Energy Services Industry Employer

Two other EDD subgrantees interviewed found their original scope of hands-on training to be insufficient and added more hands-on modules to the curriculum. The greatest challenge of hands-on training was that the skill sets required by employers are often company- or even job-specific. An employer in the weatherization industry expressed appreciation for hands-on training specific to the type of work his company does.

Employers similarly recognize the value of OJT.

"They can check out an employee, assess the risk, and mold that person to meet the needs of the individual business." – EDD Pre-Apprenticeship and Retraining Subgrantee

Some training programs offered field training and/or visits by trainees to job sites. The majority of employers interviewed expressed a preference for more job-specific fieldwork as well. These nuanced requirements of jobs in clean energy are some of the most salient training needs perceived by employers.

"I'd like to see more field training versus classroom learning. They could go to a house that is under construction at a certain stage and talk to a builder about going in to look at it. There's a liability issue there, but they would have a better understanding of how things work and what they should be looking for when they do go out on their own." – Residential Energy Services Industry Employer

Energy Commission staff noted a challenge to including hands-on training in the design of some programs. Due to Davis-Bacon Act requirements that trainees be paid for working on tasks that provide real value in the market (for example, insulating a home),[53] some subgrantees and subcontractors were restricted in the amount and type of hands-on training they could offer as part of their programs.

Basic and Ancillary Skill Development

Basic and "soft" skills include a broad array of foundational and interpersonal skills that are implicitly required in finding and keeping any type of job. The development of these skills was of particular importance to EDD trainees, many of whom were unemployed and with limited skills. Most, if not all, EDD subgrantees offered remedial math, reading, and writing courses. Depending on the subgrantee, trainees with insufficient basic skills were required to co-enroll with these remedial courses or re-enroll with the workforce training later. The types of basic and "soft" skills offered are characterized in Chapter 4.

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53 See U.S. DOE website related to Davis Bacon Act requirements and the implications for ARRA-funded SEP programs involving students and volunteers: http://energy.gov/gc/action-center-office-general-counsel/faqs-related-recovery-act/davis-bacon#7 (accessed 11/12/13).

Three of the 10 EDD subgrantees interviewed identified basic and soft skill education as a critical element of developing a trainee's career. These subgrantees offered instruction in interviewing techniques, resume workshops, job search methods, problem resolution, and punctuality reinforcement.

> *"Some of these students haven't conducted a job search in 20 years, so many of them may go through a training program, but they don't know how to talk about it during an interview." – EDD Pre-Apprenticeship Subgrantee*

EDD subgrantees interviewed also noted the importance of providing training for skills needed in the workplace, including basic tool usage and general construction. For some programs, other skill training modules were added during the program in response to the practical daily challenges of a career in clean energy. One EDD subgrantee introduced a "competent climber" certification to address the physical challenges demanded of solar panel installers and wind turbine technicians.

EDD subgrantees also provided training in the secondary skills most requested by employers, such as building drawings or "blueprint" reading. Interviewees emphasized that employers valued personal qualities, such as punctuality and reliability, more so than any certifications or occupational skill sets.

> *"Feedback from these employers suggests that soft skill training is the biggest issue, and there's a gap between the technical job-related skills and the need for these employees to show up on time every day, so we emphasize punctuality in our training." – EDD Pre-Apprenticeship and Retraining Subgrantee*

In-depth interviews with employers revealed that "showing up on time" and "demonstrating a willingness to learn" were valuable in potential employees. Certifications were valued but not nearly to the extent of soft skill qualities. The employers interviewed may not be entirely familiar with the value of certifications.

Three of five employers interviewed, who did not require certifications as a prerequisite for employment, indicated that "soft" skills and a strong work ethic were more valuable than any certification or skill set.

> *"I'm not looking for skills or certifications because in my specific line of work, most guys don't have the prerequisite skills, so I expect to train these employees from the ground-up." – Residential Energy Services Industry Contractor*

In response to the need for basic and "soft" skills, subgrantees included training in classrooms, as well as other creative ways of providing job preparation support.

> *"One community college started a resource room with some additional dollars and had an instructor there available to help students with reading, writing, and mathematics. They had a study hall with 35-40 computers and made it available to clean energy students, some of whom had never been to college." – EDD Staff*

Two employers were focused on hiring new entrants to the work force and indicated they were interested in employees that were willing to learn on the job.

> *"I don't look for anything really specific because I figure that most guys will not have that, just a willingness to listen and take direction." – Residential Energy Services Industry Employer*

Employers were also asked to identify the skills relevant to their industry that were found to be lacking in the current labor pool. In addition to other valued skill sets, several employers emphasized the need for training in basic employment-related skills, such as punctuality and an ability to take direction and work efficiently.

> *"How to use a knife and not cut yourself; how to use a ladder and not fall off; basic skills such as handling equipment; handling themselves in the midst of equipment; how to do what I tell them to do instead of what they want to do. The trainees I hired weren't being obstinate, but the only way to learn is to actually do it." – Residential Energy Services Industry Employer*

> *"Showing up. Ability to take direction and listen closely. It seems obvious, but unfortunately it is not. Most of the kids I see do not have any experience in the construction field. There is a sense, when you have worked in construction, of how to move and go about a task that is run through almost any trade in an efficient manner. It's an efficiency of movement that is surprisingly hard to knock into people's heads." – Residential Energy Services Industry Employer*

Interpersonal skills were highly desired for jobs related to sales and marketing.

> *"Most employers don't want laborers and would benefit more from a person with good communication skills who can help them sell products or services. To teach from a sales approach, you can use examples of local companies." – EDD Pre-apprenticeship Subgrantee*

Program Administration

The effective administration of CEWTP funds is a critical element of program success. Results from in-depth interviews with regional advisors, analysts, subgrantees, and subcontractors provide insight into the relative success of different program processes and implementation features. Key research questions addressed through these in-depth interviews include:

- Was the program effective in terms of recruitment and retention, and what are some of the key features of its success in terms of marketing, screening, and providing supportive services?
- How effectively did the program adapt, as training and workforce goals were re-assessed? Was it able to maintain relevance to current labor market needs and to maximizing the effectiveness of the training offered?
- Was the training delivered effectively? Did it include an appropriate balance of private and public instruction? Did it effectively leverage existing infrastructure while at the same time allow for flexibility and innovation?
- How were instructors selected, and what qualities made them most effective?
- Did the short-term nature of the ARRA funding influence program implementation effectiveness?

- Were the program's administrative, financial, and reporting requirements reasonable or overly burdensome?

Effectiveness of Trainee Recruitment and Retention

An effective recruitment and retention strategy for CEWTP trainees depended on effective marketing, recruiting, screening, and accommodation of special circumstances. Several successful strategies employed by EDD subgrantees and their associated challenges are summarized below.

Marketing

Most EDD subgrantees delivered a multipronged marketing strategy. Printed materials included press releases in the local newspaper, brochures, flyers placed with local sustainability centers and training agencies, and paid advertisements in newspapers and trade press. Personal outreach included e-mail blasts, phone calls, forum presentations, and referrals from workforce agencies. These referrals were helpful to EDD subgrantees in that they could draw upon established networks at the local workforce network between case managers and a pool of unemployed workers. The collaborations with the local workforce agencies contributed to the success of recruiting trainees for the program.

> *"There was no need for us to advertise because the WIB spread the word with posters, press releases and newspapers advertisements." – EDD Pre-Apprenticeship Subgrantee*

Recruiting

Recruiting for EDD was largely facilitated by two factors: a large pool of unemployed from which to recruit and coordination with local WIBs, and one-stop centers. Subgrantees indicated that recruitment was less of a challenge because of the pool of unemployed workers in various regions throughout the state. Local workforce agencies provided a pipeline of eligible trainees, tapped from their existing contacts with the local workforce. Workforce agencies generated program interest through resources that were already in place, including word-of-mouth, e-mail blasts, and existing relationships with the local population of unemployed.

> *"The phone was ringing off the hook." – EDD Pre-Apprenticeship Subgrantee*

Screening

To maintain a high trainee retention rate, it was important to select individuals who were most likely to attend the course until completion. General screening procedures for EDD subgrantees included an assessment of basic math and language skills, mechanical aptitude, construction experience, and work history. Some EDD subgrantees offered training that required a math level of 8th to 10th grade, and individuals unable to pass the language and math assessment were referred to remedial courses at the local career center or community college. In some cases, the trainees were required to take these courses in tandem with the training. In other cases, the trainee was not accepted into the program until the course was completed.

Of the 10 EDD subgrantees interviewed, 8 considered trainee screening to be a critical element of program implementation. Concerns regarding trainee commitment were justified because subgrantees could make no promises regarding employment prospects.

> *"We had to screen people to make sure that they were going to stay with the program that could last from 6 to 12 months with no guarantee that they would get a job in the end."— EDD Pre-Apprenticeship Subgrantee*

Trainee orientations or interviews communicated what the trainee could expect from the program and what the program's expectations were of the trainee. One EDD subgrantee described the orientation as a discussion of different certifications, legislation pertaining to the program, and being "brutally honest" about the lack of jobs. According to this EDD subgrantee, the culmination of all these screening procedures was a self-selected pool of people who were committed to sticking with the program until the end.

Retention

Once trainees had been placed into a program, it was a priority to help trainees stay with the program until completion. The most common challenge reported was that the difficulty level of the course exceeded trainee expectations. EDD subgrantees reported that trainees were surprised by the difficulty of the course load. In particular, math requirements were reported to have caused the most difficulty for trainees.

> *"Some students didn't have the math and writing skills, and although we provided them with remedial classes, they didn't want to do it. The main reason many of them dropped out was that there was a lot more reading and math than they had expected. Some people go into the program with the belief that 'construction is for dummies,' but it's not." – EDD Pre-Apprenticeship Subgrantee*

Other challenges to trainee retention became apparent as the course term progressed. For example, some trainees stopped attending class once they received an OSHA certificate upon completing an introductory safety module. As a result, one EDD subgrantee suggested that future programs should refrain from awarding any certifications until the completion of the course term. In an effort to improve retention rates, one EDD subgrantee devised a stipend policy, which provided trainees with $300 upon completion of the training program.

Interviews with EDD subgrantees also suggested that finding an optimal training schedule led to desirable retention results. Coordinating the trainee's work schedule was a challenge for training providers, especially if EDD trainees were employed part-time. According to the experiences of the EDD subgrantees, a regular but flexible training schedule allows trainees to navigate the daily challenges presented by their life circumstances and work requirements.

One EDD subgrantee revised the original training schedule from once per week during a two-month period, to twice per week during a one-month period, to reduce dropouts. In another example, a subcontractor offered an online class once per week as an alternative for those trainees who were unable to attend.

Case management was also cited as a tool used by EDD subgrantees to keep trainees engaged during the training terms and even afterward. If the trainee was absent from class, he or she received a phone call from a staff member to find out why the trainee did not attend and to identify a solution.

Supportive Services

Participation barriers can be reduced and trainee retention improved when supportive services are provided as part of the training program design. In many cases, retention problems were related to financial hardship. Some EDD subgrantees provided trainees in need with supportive services that included books, daycare services, meal vouchers, bus passes, and gas cards. The provision of gas cards was especially important for programs located in rural areas, where some trainees commuted 50 to 100 miles per day. This barrier merits special consideration because rural communities stand to benefit the most from training opportunities because of relatively high unemployment rates and few training options.

While there was universal agreement that supportive services were useful in improving recruitment and retention rates, not all EDD subgrantees offered them. In one case, where the training program was offered in rural areas, transportation costs were not covered, and this was perceived to be a significant barrier to enrollment and retention.

> *"It was difficult on the clients, many of whom were commuting 50 to 100 miles each way. Our target demographic is the unemployed, so they do not [have] the gas money, and we could not pay for their travel, so many of them had to delve into their savings." – EDD Retraining Subgrantee*

Subgrantees made a significant effort to minimize barriers to training in a number of different ways. In one case, an EDD subgrantee provided a tool-lending library to trainees to support continued learning and certification attainment. Some subgrantees and subcontractors were able to alleviate the costs incurred by the training process by accepting donations from equipment manufacturers and by coordinating additional tool-lending libraries. Other ETP subcontractors mentioned offering a financing option so that interested parties could afford the training.

Program Adaptation and Relevancy

The program's ability to adapt and modify as training and workforce goals are reassessed is key to maintaining relevance to current labor market needs. Some EDD staff identified the lack of autonomy in the decision-making process as a barrier to making needed modifications in a timely manner. That said, EDD subgrantees mentioned that some mid-stream changes were made to improve the relevancy of the courses offered. The changes were triggered by requests from potential employers, requests from trainees, or in response to changes in labor market conditions such as utility program status or fluctuations within the construction industry.

Public and Private Training

While EDD subgrantees were the parties responsible for administering the training provided under CEWTP, they were not necessarily the actual training providers. EDD subgrantees generally delivered training by three means:

- Providing the training themselves
- Coordinating with local community colleges to provide the training
- Contracting to one or many private training providers

EDD subgrantees and ETP subcontractors debated the value of public and private instruction. Some EDD subgrantees reported that they outsourced training, not because private instructors were perceived as "better," but because there were just too few options in the public sector.

Instructor Quality

Almost all the EDD subgrantees interviewed said that industry experience of instructors was critical in the effectiveness of training and that hiring instructors with relevant industry experience was one of the most important factors in effective program implementation. Instructors were gleaned from several industry sources, including trade unions, industry associations, equipment manufacturers, and local contractors. Having instructors who are actually part of the workforce helps ensure they are knowledgeable about the needed skills, especially in light of rapid changes in technology and complexities in evolving clean energy policy. Workforce development programs implemented within community colleges are particularly useful in this regard in that they can hire industry experts to deliver courses on relevant and current topics.

Training providers also valued an instructor's ability to communicate in a clear and compelling manner, using real-life examples and hands-on demonstrations. For example, in one case, the instructors within a preapprenticeship program had come from labor unions as journey-level instructors and carpenters, and these instructors could use their own experience in moving up from an apprenticeship position. Several other subgrantees and subcontractors identified trade unions as a reliable source of instructors with industry-experience.

Time Constraints

Due in part to the ARRA funding timetable, training programs – especially those provided by EDD subgrantees – had an expected schedule of 18 months, from the time the EDD grant was approved to the end of the program. One EDD regional advisor commented that the ramp-up period was too quick, and, as a result, the time to develop training was reduced. Many EDD subgrantees, especially community colleges and workforce agencies, echoed this sentiment and said that the 18-month period was too tight, especially in cases where the training programs were being built "from scratch."

Subgrantees reported that finding industry experts and developing the curriculum required more time and effort than expected. One subgrantee estimated that the first four months of the EDD grant was spent developing the curriculum and an additional two months was spent recruiting trainees. One-third of the program time frame had passed before trainees even entered the classroom. In a few cases, the program time frame was further tested when revisions to the statement of work were required in response to unanticipated circumstances, such as staff changes or labor market developments.

In conjunction with a rapid start-up period, some EDD subgrantees cited a late start to the delivery of training. More than one subgrantee indicated that their program did not run a full 18 months because of a lag time in distributing EDD grant funding. One subgrantee was not able to commence training activities until its first grant disbursement was received in April 2010, even if November 2009 was the scheduled start date. Another subgrantee experienced similar circumstances and felt "pressure to spend money even faster," despite the fact that the program had not yet launched.

Several EDD subgrantees indicated that it required more time than expected to find the appropriate industry leaders and to coordinate an advisory council. One EDD regional advisor referenced an example where a subgrantee was unable to form a council until a year into the grant period. In this case, the EDD regional advisor offered a general conclusion; the program ramped up too quickly and the 18-month duration period was too short.

Coordination

As discussed above, the delivery of training programs funded by CEWTP required the coordination of multiple diverse partners including WIBs, one-stop centers, community colleges, advisory councils, trade associations, workers unions, utilities, nonprofit organizations, and, in some cases, private training contractors. The role of each of these stakeholders varied among different training programs, and each may have played a role in curriculum design, needs assessment, employer outreach, case management, job development, and training.

Perhaps the most critical relationship in program delivery is the relationship between community colleges and the local WIB. When these two parties work together, they can streamline program delivery and widen the scope of outreach efforts.

> *"Collaboration across the three colleges in the district and with the one stops career centers allowed for strategic problem-solving. In this way the project team was able to provide job-search skills support, coordinate outreach efforts to employers, and reduce duplication of efforts." – EDD Retraining Subgrantee*

The same EDD subgrantee gave an example of how coordination between the community college and the WIB led to employer-trainee networking events and group tours of solar facilities.

While coordination between community colleges and WIBs can produce synergistic opportunities, it can also pose challenges. Coordination took additional resources and time to implement. One EDD-Pre-Apprenticeship subgrantee referred to the coordination challenges in both fiscal and programmatic elements driven largely by processes in place at both the community college and WIB. In addition, this subgrantee indicated that, because of the cap on administrative costs, much of the community colleges' financial work was done by program staff. This resulted in diverting a significant amount of the subgrantee's technical assistance staff time.

Reporting and Administrative Requirements

Another challenge of coordination centered on reporting and administrative requirements for EDD subgrantees.

Results from the in-depth interviews with EDD subgrantees suggest that there may have been conflicting and possibly redundant reporting requirements from the Energy Commission and other relevant parties. According to one EDD subgrantee:

> *"The CEC (Energy Commission) and WIB have different goals with two different approaches to training. The first is to provide energy-related skills with energy-related objectives; the second is to provide basic training to the unemployed."—EDD Pre-Apprenticeship Subgrantee*

One EDD subgrantee cited a lapse in communication with its EDD analyst, indicating that he or she lacked clear direction with respect to reporting and, as such, the reporting activities never evolved into a finalized format.

ETP Subcontractor Perspectives

Collaborative Efforts to Design Training

As discussed above, CEWTP supported the use of sector strategies to engage industry sector employers or representative industry and professional associations during the planning stages of the program to ensure that the training provided would meet the needs of the local labor market. Although few ETP subcontractors developed a formal advisory council, all ETP subcontractors considered employer input in their curriculum design, as required by the funding. Five of the six ETP subcontractors interviewed cited employer collaboration as one of the most important elements of program design.

> *"Our training was designed by employers who knew exactly what skills and certifications they were going to need." – ETP Career Advancement Subcontractor*

A few also stated that the instructors of the training activities implemented through the ETP Career Advancement program element worked in the industry and could also serve to guide curriculum according to workforce needs.

Training Characteristics

The following summarizes key characteristics of the training activities implemented by ETP subcontractors:

- **Certifications.** As mentioned above, a key goal of CEWTP was to promote the development and adoption of third-party accredited certification programs and to equip the clean energy workforce with portable and stackable credentials and certifications. In addition to helping with recruitment, retention, and job placement, these certifications increased the likelihood of the sustained participation of trainees in the clean energy industry. As reported above, more than 3,500 industry-recognized certifications were attained because of the training.

The interviews and surveys provided a few insights into whether the certifications align with industry need. For example, BPI certification was cited on several occasions as being particularly useful.

> *"Most students were able to achieve BPI certification status, which is rapidly becoming a standard for hiring contractors in California." – ETP Career Advancement Subcontractor*

For ETP subcontractors whose primary market is commercial customers (as opposed to residential), flexibility to allow for certification development over time was a key factor.

> *"The certifications that Energy Commission found appropriate were actually designed for housing, while the bulk of our work was commercial, and the Energy Commission recognized certifications for commercial had not been developed completely when we started our project."—ETP Career Advancement Subcontractor*

- **Sales and Marketing Skills Development.** While most ETP subcontractors reported that trainees already possessed the basic skills necessary to conduct their job, some offered modules to develop the interpersonal skills necessary for sales and marketing in clean energy. According to ETP subcontractor reports, these modules were useful and effective. One subcontractor stated in its final monitoring visit report that advanced sales training significantly influenced the quality and effectiveness of customer outreach efforts, with sales doubling over time. Similarly, one ETP subcontractor attributed improvement in company revenue to the sales and marketing methods taught in the ETP Career Advancement training. In its final monitoring visit report, this subcontractor indicated that it was able to keep the employees working full time where previously they had to lay them off for periods of the year.

Program Administration

This section presents results from in-depth interviews with ETP staff and subcontractors regarding the relative success of different program processes and implementation features.

Effectiveness of Recruitment and Retention

The following sections present results relevant to recruitment and retention of ETP employers as well as trainees.

Marketing

The ETP Career Advancement program element was designed to train incumbent workers or new hires and did not include funding for subcontractors to market the program. Although marketing the training may have not been necessary for ETP subcontractors who were the employers of the trainees, a limited marketing capacity may have thwarted recruiting efforts by subcontractors that were not employers, for example, trade associations, community colleges, and unions. While some ETP subcontractors implemented many of the marketing methods mentioned above for EDD, a few subcontractors lacked the resources to prepare a robust

marketing plan. One ETP subcontractor expressed frustration that while the ETP grant included provisions for administrative costs incurred, it did not appropriate funds for marketing costs.

In addition, at least two of the ETP subcontractors interviewed reported competition, rather than coordination, with other training programs, some of which were funded by other public sources. One subcontractor indicated that the variety of choices make it difficult for its program to stand out.

> *"Our biggest barrier was competition in the marketplace and convincing these businesses that our program is the right one for them. Our target market of contractors does a lot of shopping around when it concerns employee training." – ETP Career Advancement Subcontractor*

> *"Competing with other heavily subsidized training which came on the market (at the same time as the) ETP program. (These programs were) without the reimbursement wait periods and other data and employer and trainee information requirements associated with ETP. As a result those employers/individuals looking for discounted training had other easier options to choose."— ETP Career Advancement Subcontractor*

Recruiting

The challenges that ETP staff and subcontractors faced with respect to recruiting were unique to the design requirements of the Career Advancement program element. Subcontractors cited challenges in regards to certifying employers, recruiting trainees, and facing a weak employer demand for training. In the final monitoring visit report, the ETP regional analyst reported three barriers to recruiting:

1. Cash flow – the size of the initial cash outlay required of small businesses to pay training vendors, and the delay in reimbursement
2. Competition – similar training reimbursed at a higher rate with less burdensome administrative requirements
3. Weak demand for trained workers – driven by lack of programs and policies supporting home improvement projects

In addition, uncertainty surrounding government and utility incentive programs was cited as a barrier to effective program planning and recruitment of employers.

> *"The rebate rules for solar PV were changed so frequently that it made planning our program difficult and therefore made it difficult to sell the program to employers." – ETP Career Advancement Subcontractor*

Discussions with ETP subcontractors revealed they felt that the original eligibility requirements stated in the proposal were too restrictive. Some subcontractors stated that their training proposal only permitted them to use funding to train employees working for established construction companies, and in some cases, only for clean energy companies.

"We would have been able to recruit more trainees if there had been more flexibility in the program design. We lost a lot of (training candidates who didn't qualify) because they didn't have any experience in the solar industry."—ETP Career Advancement Subcontractor

Over time, ETP adjusted its eligibility requirements to include government employees, independent contractors, sole proprietors, and other related businesses. One ETP subcontractor indicated that the success of its program hinged on making these types of changes to the eligibility requirements.

"Our program really took off when regulations for the program were expanded to include sole proprietors, who might only employ one or two (part-time) staff. Our major demographic was solely owned contractors that had been in business for a while but were looking to develop and expand into clean energy." – ETP Career Advancement Subcontractor

In addition, employer commitment had been observed to lag in the period between the proposal and the program launch.

"When we submitted the proposal, we had 10 companies who wanted to send their employees through the program, but none of these employers came through. After we signed the contract, the solar industry got turned on its head, and these companies started laying people off." – ETP Career Advancement Subcontractor

One ETP subcontractor explained in its final monitoring report that the demand for training was reduced due to layoffs in the solar industry and the lack of demand for jobs in the future. Similarly, in an attempt to cut costs and survive through the economic downturn, employers were less willing to invest in training programs. As mentioned above and described in more detail in Chapter 2, the ETP Career Advancement program element required subcontractors to pay upfront for training expenses and be reimbursed in increments based on performance criteria (that is, upon enrollment and after completion of the initial eight training hours, after the completion of all training hours, and after completion of the retention requirement).

Screening

Attributes used to screen potential employers varied among ETP subcontractors. One subcontractor considered small businesses to be a poor fit because employers at these businesses were not equipped to tolerate the absence of such a large portion of their staff as they attend training. Other subcontractors, however, found small business employers to be ideal candidates and had success working with them in the training.

Retention

Similar to what was mentioned above for EDD, a common challenge regarding trainee retention was that the course was more difficult than expected, especially with respect to the math requirements.

"Math was especially an issue among the workforce participants… Many dropped out because it was too much for them once the program began."—ETP Career Advancement Subcontractor

In addition, coordinating with the trainee's work schedule was another retention challenge for some ETP subcontractors, especially as many ETP trainees were employed full time. An ETP analyst stated that reducing the minimum training hours per trainee from 24 hours to 8 hours was helpful in accommodating those who were interested in training in only certain areas. This change also led to an increase in the total number of trainees enrolled in ETP Career Advancement training programs.

Supportive Services

ETP subcontractors also acknowledged that retention problems were often related to the need for supportive services. Like EDD subgrantees, some ETP subcontractors were able to alleviate the costs incurred by the training process by accepting donations from equipment manufacturers and by coordinating with existing tool-lending libraries. Other ETP subcontractors mentioned offering a financing option so that interested parties could afford the training.

Program Adaptation and Relevancy

As discussed above, ETP staff and subcontractors also expressed concern that they lacked autonomy in making decisions processes and were at times unable to implement changes to the curriculum in a timely manner. However, like EDD subgrantees, ETP subcontractors were able to make some midstream changes to improve the relevancy of the courses offered.

Public and Private Training

ETP subcontractors debated the value of public and private instruction. One ETP subcontractor felt strongly that, although often more expensive, private instruction is superior to what can be offered through community colleges. While not universally true, this ETP subcontractor felt that private training providers often include more hands-on training, can use more experienced instructors, can offer smaller classes (under 20 students), and tend to have better facilities to demonstrate different types of installations.

Established and Start-Up Training Programs

All three of the ETP analysts interviewed felt that large and established training programs demonstrated greater success than small, start-up programs. ETP analysts listed several reasons for this observation. Established programs, such as those offered by trade associations, unions, and community colleges, have a preexisting curriculum and training infrastructure that is ready to be implemented. These programs have experienced teaching staff on-hand and have long-standing relationships with industry partners. Established programs are unencumbered by the need to develop a curriculum and network of industry partners. With start-up programs, the first 6 months of the 18-month funding term may be spent in a scramble to develop a curriculum and establish a network of industry partners.

> *"The building association already had a program set up, and many people in the industry are already familiar with this organization, so the industry is familiar with their website and knows that they offer training. On the other hand, there is a well-established community college, but the program was not part of their usual curriculum, so they had to start from scratch and it was more*

difficult for them to recruit eligible trainees and find trainers in suitable locations."—ETP Analyst

In addition, ETP staff indicated that established programs were more likely to continue their training programs beyond the grant term than start-up programs. Finally, while some staff felt there was a place for the small, less-established programs that can offer more innovation in training, established programs have proven track records and can be counted on to achieve scale when needed.

Instructor Quality

Like EDD subgrantees, ETP subcontractors agreed that that the industry experience of instructors was critical in the effectiveness of training and that hiring instructors with relevant industry experience was one of the most important factors in effective program implementation.

Time Constraints

The short-term nature of the program was an issue for ETP subcontractors, as well as EDD subgrantees. While one ETP subcontractor scrambled to replace departed staff, another subcontractor had difficulty meeting ETP requirements related to instructor certifications.

Reporting and Administrative Requirements

Another challenge of coordination centered on reporting and administrative requirements for ETP subcontractors.

> *"The biggest barrier was the level of documentation that was required to show proof of trainees attending training… Certificates were submitted by the trainees as a form of proof of training, but ETP did not accept these as valid forms of proof of training. This posed an even bigger problem when the companies providing the training were not able to get a hold of the instructor to sign the correct roster for the trainings." – ETP Career Advancement Subcontractor*

Another ETP subcontractor admitted to challenges having to do with learning what type of information needed to be tracked and how to input that information into the online ETP reporting system. In this one case, the ETP subcontractor claimed that this learning curve hindered the ability to use its entire funding amount.

Two ETP analysts also indicated there was a "steep learning curve" associated with the administrative requirements of the program. An ETP analyst attributed the underperformance of one subcontractor to the small business size and insufficient administrative capacity.

> *"The business was a little bit too small. Their business model did not allow them to train the number of people that they wanted, and their success was limited by the size of their business, rather than some flaw in their training plan. Perhaps smaller subrecipients might be better served by looser administrative requirements." – ETP Analyst*

Program Sustainability

CEWTP was implemented with the hope that it would ensure the continued viability and sustainability of its workforce development functions beyond the expiration of ARRA. The collaborative bonds formed between educational institutions, industry advisory councils, and local workforce agencies will prove critical in sustaining clean energy training into the future.

Through in-depth interviews, the sustainability of clean energy workforce training programs was assessed along three dimensions:

- Has clean energy workforce training been incorporated into standard curricula?
- Is there sufficient funding available (beyond the ARRA period)?
- Is there continued (projected) demand for clean energy training?

While subgrantees and subcontractors may not be able to project future demand for training, they are able provide insight the first two indicators. Table 31 summarizes the responses given during the in-depth interviews.

Table 31: Indicators of Sustainability

	Integrated into Standard Curriculum?	Other Funding Available?	Is Program Sustainable Beyond CEWTP?
EDD Subgrantees	70% (7 of 10)	80% (8 of 10)	70% (7 of 10)
ETP Subcontractors	83% (5 of 6)	67% (4 of 6)	83% (5 of 6)
All	75% (12 of 16)	75% (12 of 16)	75% (12 of 16)

Source: DNV KEMA analysis

Most subgrantees and subcontractors agree that CEWTP has been successful in that clean energy workforce training has been incorporated into standard training curricula. In some cases where the training was provided by community colleges, clean energy training has been incorporated into the curriculum as a requirement for an associate's degree program or has been listed as an independent, fee-based module. One subgrantee indicated that a solar-installation module has been introduced at the local workforce development agency. In another case, one ETP training provider had introduced a "franchise model," in which select employers are provided with the resources necessary to enable them to train their own employees.

Post-ARRA, the subgrantee and subcontractor knowledge of available funding varied according to the nature of the organization, as would be expected. That said, in the context of a stressed

clean energy economy, there was still a strong focus on continuity. Five of the six community colleges interviewed indicated that they had applied for or expected to receive funding from public funding streams and the college districts with which they were affiliated. Such funding sources include scholarships, student fees, Department of Rehabilitation, and the Department of Labor (DOL).

Of the five WIBs interviewed, three said that they could expect to receive funding from one of the following sources: WIA funding, State Energy Sector Partnership, community colleges, and county resources. At least one subgrantee reportedly built a sustainable funding framework based on nonprofit organizations and charitable contributions. Several community colleges indicated that programs would be fee-based, until approved to be under the credit/noncredit structure of the general curriculum. One ETP subcontractor said private enrollment fees would determine the future of their program.

Even under the best labor market and economic conditions, sustainability is often the most challenging goal for new and developing programs. Yet, subgrantees and subcontractors were optimistic that clean energy training programs would continue beyond the ARRA period. Twelve of the 16 interviewed said that such programs were sustainable into the future with adequate funding and demand for clean energy training.

In many cases, training activities implemented by ETP subcontractors were not designed to be sustainable, and some ETP subcontractors confirmed that continuation of their training programs was not planned. They offered a variety of reasons, including onerous administrative requirements or a change of organizational focus from supporting supply to encouraging demand.

> *"We always thought of this opportunity as a one-time event. As a nonprofit organization, we have decided that our best focus is on educating consumers about solar, rather than people in the industry. There are already so many solar programs, so we would like to address the lack of unbiased consumer options instead." – ETP Career Advancement Subcontractor*

One EDD subgrantee stated that trainee demand will mostly be determined by industry support and its related projects. Policy support, in the form of incentive programs and large-scale projects, would drive employers to hire from the labor pool, which, in turn, would seek out training from community colleges and private training providers. Dedicated training providers reaffirmed their mission to provide workforce education as long as demand sufficed.

> *"If there's economic demand for solar installation, then students and employers will pay for training. But if there's no work for electricians and solar installers, and there's no demand, then the training won't continue." – ETP Analyst*

CHAPTER 7:
Training Participant Survey Results

This chapter presents detailed findings from telephone surveys with 306 training participants. The survey provided insight into program implementation effectiveness and outcomes from the perspectives of the training participants. Survey questions addressed how well the training they received aligned with industry needs and career pathways.

As discussed in Chapter 3, the telephone survey respondents included participants from both EDD subgrantee and ETP subcontractor programs for which contact information was provided. Table 32 presents a summary of the sample design. Appendix B includes copies of the survey instruments, and summary responses to each question are contained in Appendix C.

Table 32: Training Participant Surveys

Program Element	Number of Subgrantees/Subcontractors in CEWTP Population	Number of Subgrantees/Subcontractors Represented in Survey Sample	Number of Participant Surveys Completed
EDD Pre-Apprenticeship	18	10	128
EDD Retraining	10	4	73
ETP Career Advancement	13	13	105
Total	41	27	306

Source: DNV KEMA

The objectives of CEWTP included preparing workers with skills to meet the anticipated needs of the clean energy labor market and creating career pathways for the trainees. Survey questions addressed a number of factors to assess participant views on how well aligned the training they received was with industry needs and career pathways. The questionnaire addressed a number of related research questions, as summarized below:

- Were the topics addressed by the training in line with expectations about what the local labor markets would require?
- Were the types of certifications obtained also aligned with these needs?
- Was the employment status of participants – at the time of the training as well as subsequent to the training – consistent with the ways in which the different programs were targeted to different employment groups?
  - Were participants employed prior to the training? For how long?
  - Are participants currently employed? At what level or position? Full-time?
- Was the training effective and relevant?

    - Were the training topics related to participants' current job?
    - How did recently hired participants find their current job?
    - Did the program provide job placement services?
    - Did participants use career services to obtain their current job?
    - Are participants employed in energy-related fields?
    - Do participants view their current job as "a career"?
    - Has participation in the training affected participants' career paths?
    - Did participant knowledge and skill improve after training?
- Have participants applied for new jobs since participating in the training?
    - What field were these jobs in?
- How long have participants been unemployed?
- How satisfied were participants with the training received?
    - With the training, overall?
    - With the clarity of communications, content?
    - With the newness of material?
    - Was it relevant to career path?
- How did participants hear about the training program?
- What were the drivers of participation?
- Were there any barriers to completing the training?
- What worked well?
- What could be improved?

The following sections summarize the results from the training participant surveys.

Alignment of Training Topics with Expected Labor Market Needs

As discussed in Chapter 4, the CEWTP training activities provided training on a diverse range of topics. Participants confirmed they had received training on a wide range of topics consistent with the needs of the labor market. As shown in Table 33:

- More than two-thirds of participants from the EDD Pre-Apprenticeship program element were instructed on topics related to energy efficiency or solar, and about one-half received training on construction, equipment installation, or weatherization practices.
- The majority of participants from the EDD Retraining program element received training covering energy efficiency and/or construction industry topics, followed by solar technologies and building codes.
- A little more than half of the participants from the ETP Career Advancement program element reported having attended training on solar technologies, and a third participated in training that addressed energy efficiency and/or equipment installation.

Table 33: Topics Addressed by Training

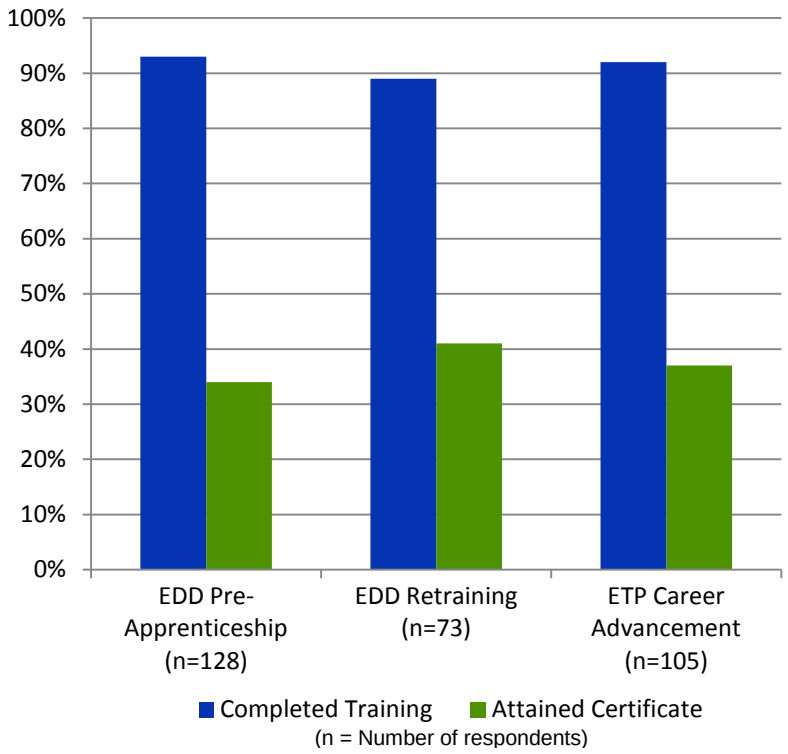
Training Topic	EDD Pre-Apprenticeship	EDD Retraining	ETP Career Advancement
Energy efficiency	70%	53%	35%
Solar	69%	45%	57%
Construction	53%	52%	19%
Equipment installation	49%	29%	35%
Weatherization	48%	27%	18%
Building codes	40%	37%	18%
Water conservation	39%	34%	15%
Audits	39%	27%	12%
Number of respondents (n)	128	73	105

Source: DNV KEMA

Training Completion and Certifications

Participants were asked to confirm whether they completed the training course they had enrolled in, and whether they had earned any certifications or licenses through the training. Participants confirmed the high rates of retention discussed earlier in this chapter. The results shown in Figure 4 indicate that, overall, about 90 percent of participants confirmed that they had completed the training, and about 30 percent to 40 percent of participants reported that they obtained a certification through the training.

Figure 4: Training Completion and Certification Attainment



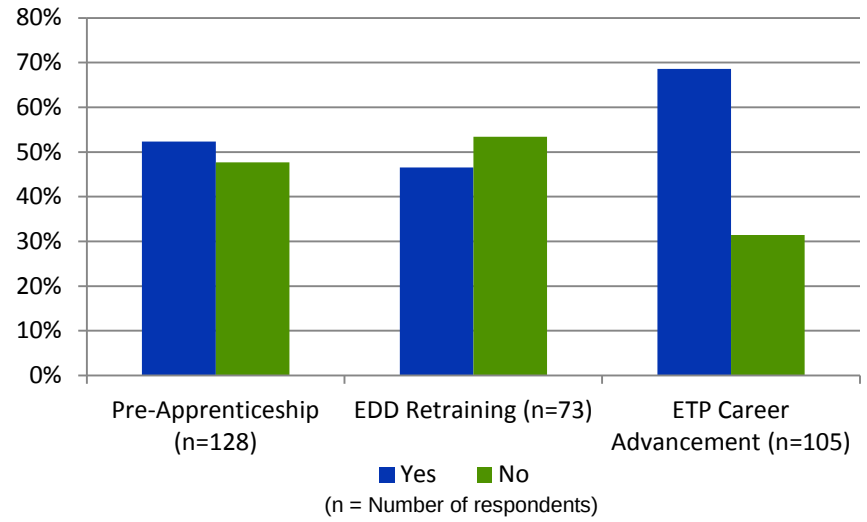
Source: DNV KEMA

Targeted Employment Groups

Are Participants Currently Employed?

Participants were asked if they were currently employed (at the time of the survey). As shown in Figure 5, nearly half of the participants from the EDD Pre-Apprenticeship and Retraining program elements and more than two-thirds of the participants from the ETP Career Advancement program element reported as being employed at the time of the survey. These results are not surprising. The ETP Career Advancement program element was designed to train incumbent workers or new hires, whereas EDD subgrantees targeted unemployed workers and, as discussed above, many experienced difficulties placing trainees in jobs following the training programs.

Figure 5: Training Participant Employment Status (at Time of Survey)



Source: DNV KEMA

Were Participants Employed at the Time of the Training?

Similarly, participants reported being employed at their current jobs for periods that are consistent with the different training program targets. The majority of participants in the ETP Career Advancement program element (72 percent) reported being employed in their current position since they began the training. This compares to 21 percent and 29 percent of participants from the EDD Pre-Apprenticeship and EDD Retraining program elements, respectively.

How Long Have Participants Been (Currently) Employed?

As shown in Table 34, 60 percent of participants the ETP Career Advancement program element reported having been at their current job for five years or more, and 68 percent of respondents from the EDD Pre-Apprenticeship program reported having been at their current jobs less than one year. These results are consistent with the design of these two program elements in that ETP subcontractors targeted incumbent workers, and the EDD Pre-Apprenticeship program element targeted unemployed workers and new entrants. Participants in the EDD Retraining program element were more evenly distributed.

Table 34: Duration of Current Employment (at Time of Survey)

Duration at Current Job	EDD Pre-Apprenticeship	EDD Retraining	ETP Career Advancement
Less than 6 months	40%	29%	15%
Between 6 months and a year	28%	21%	10%
Between 12 months and 18 months	6%	6%	4%
Between 18 months and 2 years	3%	12%	3%
Between 2 years and 5 years	7%	12%	8%
5 years or more	13%	21%	60%
Number of respondents (n)	67	34	72

* Sample includes only those participants who were currently employed at the time of the survey.

Source: DNV KEMA

At What Level or Position are Participants Currently Employed?

Participants reported being employed in positions that were consistent with how the programs were targeted, as shown in Table 35. The participants in the EDD Pre-Apprenticeship program element were more likely to report having entry-level or apprentice-level positions, while participants from the ETP Career Advancement program element were more likely to report having mid- or upper-level positions. The participants in the EDD Retraining program element were more evenly distributed but trending more toward the mid- to upper-level positions.

Table 35: Employment Level (at Time of Survey)

Employment Level	EDD Pre-Apprenticeship	EDD Retraining	ETP Career Advancement
Entry-level or Apprentice	45%	24%	6%
Mid-level or Journeyman	34%	32%	46%
Upper-level or Master	18%	41%	40%
Other	3%	3%	7%
Number of respondents (n)	67	34	72

* Sample includes only those participants who were currently employed at the time of the survey.

Source: DNV KEMA

Are Participants Employed Full Time?

Most participants reported being employed for at least 40 hours per week, ranging from 78 percent for participants from the ETP Career Advancement program element, 75 percent for participants from the EDD Retraining program element, and 62 percent for participants from the EDD Pre-Apprenticeship program element. More than one-quarter of participants from the EDD Pre-Apprenticeship program element (27 percent) work fewer than 30 hours per week.

Table 36: Hours per Week (at Time of Survey)

Hours per Week	EDD Pre-Apprenticeship	EDD Retraining	ETP Career Advancement
Fewer than 30 hours	27%	19%	6%
30-39 hours	11%	6%	16%
40 or more hours	62%	75%	78%
Number of respondents (n)	67	34	72

* Sample includes only those participants who were currently employed at the time of the survey.

Source: DNV KEMA

Effectiveness and Relevance of Training

Were the Training Topics Related to Participants' Current Job?

Currently employed participants were asked whether topics covered in the training they received were relevant to their current line of work. As shown in Table 37, about two-thirds of participants from the ETP Career Advancement program element and about 50 percent of participants from the EDD Pre-Apprenticeship and Retraining program elements indicated that the training topics were related to their current job. Again, this is somewhat consistent with the design of the program elements in that the participants from the ETP Career Advancement program element were the most likely to receive training relevant to their current occupational field. These results also demonstrate that the training offered an entry point and/or supported growth along a participant's chosen career path. Participants also expressed agreement that their career had advanced – or will advance – because of the training, further suggesting the value they have placed on their experience.

Table 37: Topics Addressed by Training

Training Topics	EDD Pre-Apprenticeship	EDD Retraining	ETP Career Advancement
Solar, PV or Thermal	29%	6%	10%
Design, Building and Construction	18%	18%	8%
Energy Efficiency, Energy Fundamentals, Renewables	18%	12%	17%
Equipment Installation, Retrofitting	15%	29%	29%
Basic Skills, Safety, Health	12%	6%	19%
Codes, Standards, Inspection	3%	12%	6%
Audits, HERS, Building Performance Institute	3%	6%	2%
Other	6%	12%	8%
Number of respondents (n)	34	17	48

* Sample includes only those participants who were currently employed at the time of the survey and who indicated CEWTP training topics were related to their current job.

Source: DNV KEMA

How Did Recently Hired Participants Find Their Current Job?

Participants who had only been recently hired (within the last 18 months) were asked how they found their (relatively) new job. As shown in Table 38, participants reported several referral sources associated with the training program such as trade unions, training instructors, employer partnership, and employment services. Other commonly reported sources included classified ads (especially common for the participants from the EDD Pre-Apprenticeship and Retraining program elements) and word-of-mouth sources.

Table 38: Job Referrals/Sources for Recent Hires (within Last 18 Months)

Job Referrals/Sources	EDD Pre-Apprenticeship	EDD Retraining	ETP Career Advancement
Original employee/founder of business	6%	18%	21%
Union member	4%	9%	38%
Job listing offered by training or instructor	12%	3%	0%
Recruited through employer partnered with training	7%	9%	3%
Employment services (for example, One-stop, work investment agency)	10%	3%	4%
Friend, Word of mouth	25%	18%	14%
Classified advertisement (online, newspaper)	18%	35%	8%
Walk-in application	9%	0%	3%
Number of respondents (n)	67	34	72

* Sample includes only those participants who were currently employed at the time of the survey.

Source: DNV KEMA

Did Participants Use Career Services to Obtain Their Current Job?

Participants who reported that the program had helped them obtain their (current) job were asked whether they used career services available from the program. While the overall sample size of participants is small for each program element, the results shown in Table 39 are consistent with expectations. Participants from the EDD Pre-Apprenticeship and Retraining program elements reported using a variety of services provided by the program elements, whereas 85 percent of the participants from the ETP Career Advancement program element did not use any career services.

Table 39: Job Referrals/Sources for Recent Hires (within Last 18 Months)

Program Employment Services	EDD Pre-Apprenticeship	EDD Retraining	ETP Career Advancement
Resume and interview workshops	58%	53%	8%
Job placement service	58%	20%	8%
Career coaching/planning	42%	33%	0%
Access to job boards/fairs	42%	20%	0%
Did not use any career services	29%	33%	85%
Number of respondents (n)	24	15	13

* Sample includes only those participants who reported that the program had helped them obtain their (current) job.

Source: DNV KEMA

Are Participants Employed in Energy-Related Fields?

The majority of participants currently employed at the time of the survey reported having jobs in an energy-related field. As shown in Table 40, the occupational fields of currently employed participants varied by program element. Across all participant groups, however, more than one-quarter were employed within the general trades industry. A significant percentage of the participants from the ETP Career Advancement program element reported they were working in the electrician field.

Participants reportedly working in non-energy related fields was highest among the participants in the EDD Pre-Apprenticeship program element (45 percent), followed by EDD Retraining (32 percent), and ETP (15 percent). This trend appears to reflect differences in the ways in which the different training programs were designed – with ETP focused on incumbent workers already employed in energy-related jobs, whereas the EDD Pre-Apprenticeship and Retraining program elements were targeted to new entrants, unemployed and underemployed, many of which have yet to transition into energy-related occupations.

Table 40: Occupational Fields of Training Participants

Occupational Field	EDD Pre-Apprenticeship	EDD Retraining	ETP Career Advancement
General Trades	27%	26%	31%
Electrician	4%	12%	38%
Solar sales/installation	6%	9%	0%
Building Energy Auditor	6%	9%	4%
Other	1%	12%	1%
Non-energy related field	45%	32%	15%
Number of respondents (n)	67	34	72

* Sample includes only those participants who were currently employed at the time of the survey.

Source: DNV KEMA

Do Participants View Their Current Job as "a Career"?

Participants who were employed at the time of the survey were asked whether they considered their current job "a career." As shown in Table 41, most participants reported that they felt their current job was along their chosen career path. Again, it is not particularly surprising that the participants from the ETP Career Advancement program element were the most likely (89 percent) to consider their current job "a career," and the participants in the EDD Pre-Apprenticeship program element were the least likely (61 percent) to consider their current job "a career." This is not only consistent with differences in the program design, but consistent when one considers that many of the participants from the EDD Pre-Apprenticeship and Retraining program elements also reported only being employed in their current, relatively low-level positions for less than one year.

Table 41: Current Job as "Career"

Consider Current Job Part of Long-Term Career?	EDD Pre-Apprenticeship	EDD Retraining	ETP Career Advancement
Yes	61%	74%	89%
No	34%	18%	6%
Don't know	4%	9%	6%
Number of respondents (n)	67	34	72

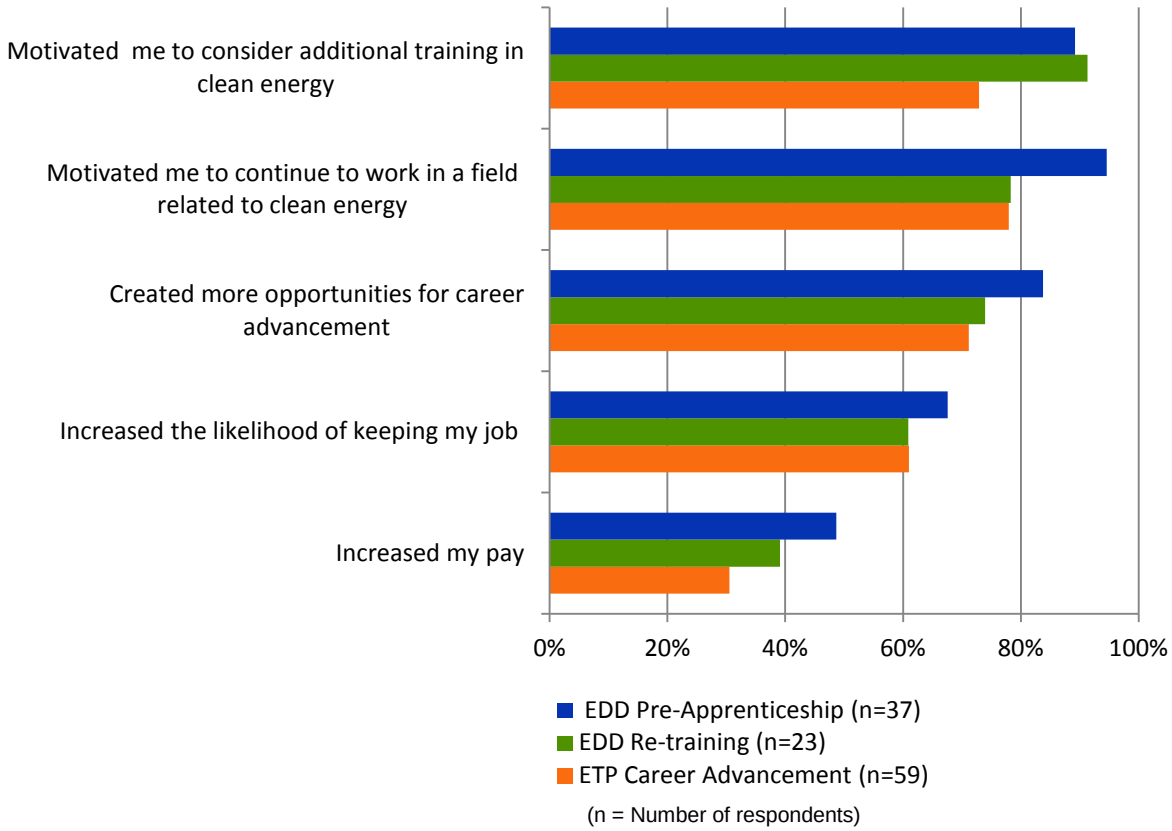
* Sample includes only those participants who were currently employed at the time of the survey.

Source: DNV KEMA

Has Participation in the Training Affected Participants' Career Paths?

Participants were asked to indicate whether the training may have affected their career path in various ways. Two groups were asked this question: (1) participants who had the same job as when they began the training, and (2) participants who reported that the training helped them get their (current) jobs. Figure 6 shows the results.

Figure 6: Career Path Benefits From Training



* Sample includes only those participants who had the same job as when they began the training and participants who reported that the training helped them get their (current) jobs.

Source: DNV KEMA

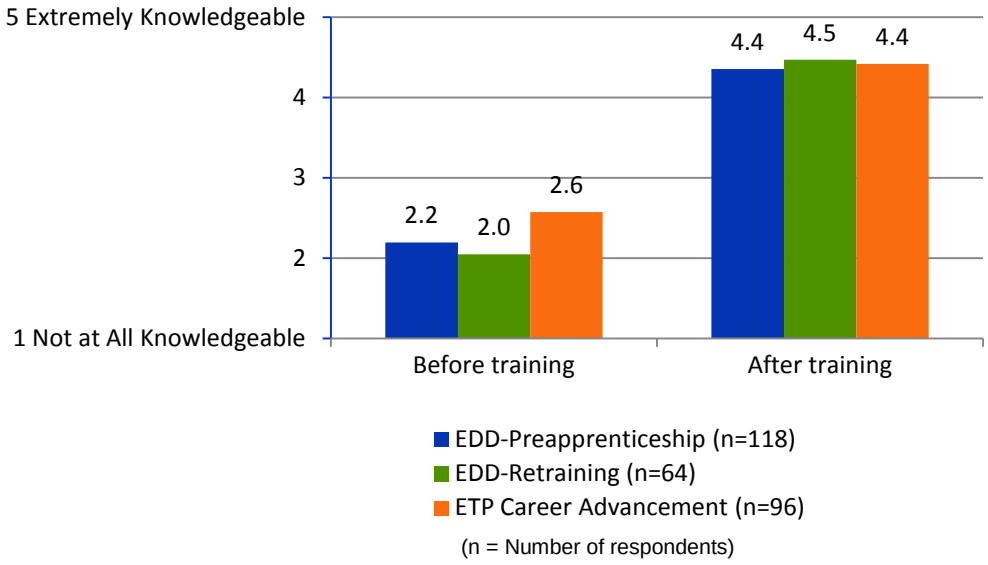
Generally, more than two-thirds of participants from all three program elements agreed that the training had motivated them to continue to work in a field related to clean energy, that the training motivated them to consider additional training in clean energy, and that the training created more opportunities for career advancement. Participants also agreed, to a lesser extent, that the training increased the likelihood of keeping their job. A considerable percentage (between 30 percent and 50 percent, depending on the participant group) also reported that participating in the training had led to an increase in their pay.

Did Participant Knowledge and Skill Improve After Training?

The participant survey asked questions about the level of knowledge pre- and posttraining. Specifically, participants were asked to indicate on a scale of 1 to 5, where 1 represented "not at all knowledgeable" and 5 indicated "extremely knowledgeable," how knowledgeable they felt they were about the topics addressed through training once the activities were completed. As shown in Figure 7, overall, participants in all three program elements rated their level of knowledge higher after attending the training.

Compared to EDD, the participants from the ETP Career Advancement program element rated themselves as having been slightly more knowledgeable of the training topics before having attended the training, which is somewhat expected given that the ETP Career Advancement training activities were designed to train incumbent workers or new hires. As such, the participants from the ETP Career Advancement program element were more likely to have had knowledge of some of the topics before participating in the training.

Figure 7: Knowledge of Training Topics Pre-/Post-Training



Source: DNV KEMA

Employment Searches Posttraining

Have Participants Applied for New Jobs Since Participating in the Training?

Participants were asked about whether they had applied for (new) jobs since they obtained training. This question was asked only of participants who were not currently employed (at the time of the survey) or who had the same job as when they started training. Among this group of participants, about 80 percent of the participants from the EDD Pre-Apprenticeship and Retraining program elements reported having applied for a new job, compared to only 30 percent of the participants from the ETP Career Advancement program element. Reasons given

for not applying for a job included already having a job or being self-employed, being a student, having the union taking care of finding them a job, being retired, or having physical limitations.

What Field Were These Jobs in?

Of participants who had applied for jobs, the majority had applied for jobs in fields related to the clean energy industry, as shown in Table 42. Almost half of the participants in the EDD Pre-Apprenticeship program element who applied for jobs were seeking employment in solar sales or installation, whereas 31 percent of the participants in the EDD Retraining program element were looking for jobs as building energy auditors. The participants from the ETP Career Advancement program element reported having applied for jobs in the solar field, as electricians or as energy laborers.

Table 42: Types of Jobs Applied for Posttraining

Type of Job Applied for Post-Training	EDD Pre-Apprenticeship	EDD Retraining	ETP Career Advancement
Solar sales/installation	47%	17%	31%
Building energy auditor	11%	31%	0%
Electrician	6%	6%	21%
Energy laborer	6%	4%	21%
Energy technician	4%	8%	3%
Non-energy related	22%	33%	24%
Number of respondents (n)	96	52	29

* Sample includes only those participants who were not currently employed at the time of the survey or who had the same job as when they started training and reported that they had applied for jobs since obtaining training.

Source: DNV KEMA

Duration of Unemployment

How Long Have Participants Been Unemployed?

Participants who did not have jobs at the time of the survey were asked how long they had been unemployed, as shown in Table 43. Again, consistent with program design, nearly two-thirds of the participants from the ETP Career Advancement program element (61 percent) were most likely to have been only recently unemployed (less than six months). It is somewhat surprising, however, that about one-quarter of the participants from the ETP Career Advancement program element have been unemployed for more than two years. Results for the EDD participant groups are more evenly distributed.

Table 43: Types of Jobs Applied for Posttraining

Length of Time Unemployed	EDD Pre-Apprenticeship	EDD Retraining	ETP Career Advancement
Less than 6 months	26%	18%	58%
Between 6 months and a year	15%	15%	3%
Between 12 months and 18 months	11%	26%	9%
Between 18 months and 2 years	15%	10%	6%
Between 2 years and 5 years	20%	31%	21%
5 years or more	13%	0%	3%
Number of respondents (n)	61	39	33

* Sample includes only those participants who were not currently employed at the time of the survey.

Source: DNV KEMA

Satisfaction with Training Program

The survey assessed satisfaction with the training program by asking participants to rate the extent to which they agreed with several affirmative statements regarding training content. Questions were asked on a five-point scale, where "1" means "I strongly disagree" and "5" means "I strongly agree." Participants were asked about their satisfaction with the training overall, whether the topics were clearly communicated, whether the material presented was new to them, and whether it was relevant to their career path. Overall, participants from all program elements expressed high ratings of satisfaction with the overall training and training delivery, as shown in Table 44. The only element to have an average rating of less than a "4" was whether the material provided in the training was new to them.

Table 44: Average Satisfaction Ratings

Satisfaction Statement	EDD Pre-Apprenticeship	EDD Retraining	ETP Career Advancement
I was satisfied with the training overall	4.3	4.4	4.4
The training topics were clearly communicated	4.5	4.5	4.5
Much of the material provided during the training was new to me	3.9	3.7	3.6
The material provided by the training was relevant to my desired career path	4.1	4.2	4.2
Number of respondents (n)	119	65	97

* Rating scale: 1 (strongly disagree) to 5 (strongly agree)

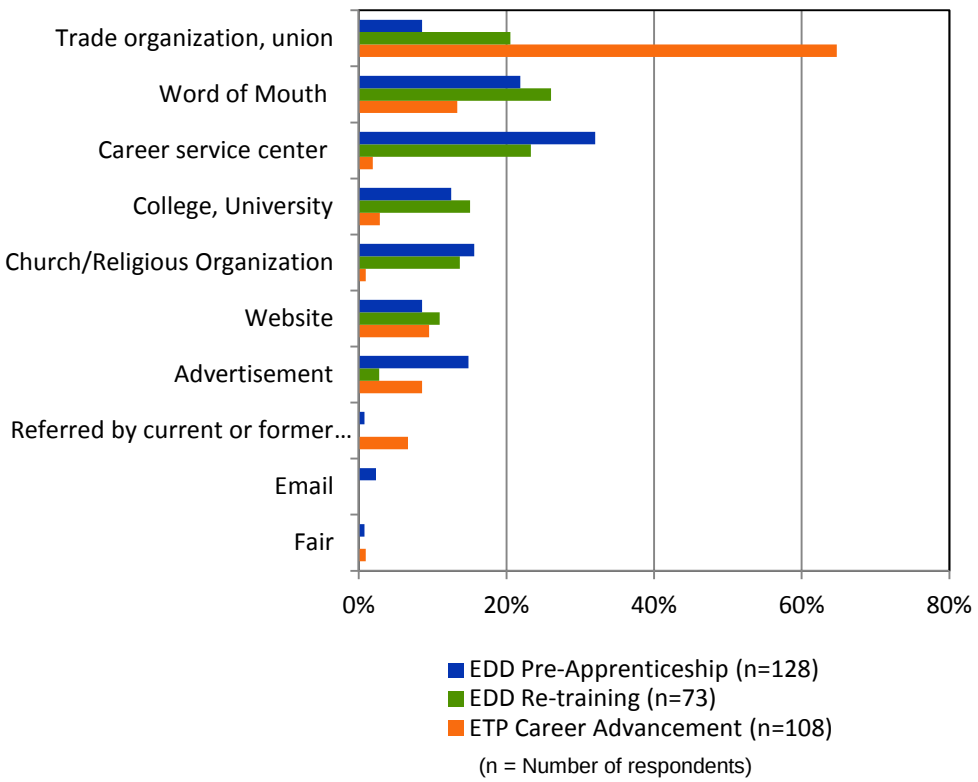
Source: DNV KEMA

Program Marketing, Participant Drivers, and Barriers

How Did Participants Hear about the Training Program?

Participants were asked how they learned of the program. Since each program targeted different types of participants, it is understandable that participants reported hearing about the program from a variety of sources. As shown in Figure 8, one-third of the participants in the EDD Pre-Apprenticeship program element, which targeted individuals with little to no work experience, heard about the training from the local career service center. Nearly another third of the participants in the EDD Pre-Apprenticeship program element learned about the program from word-of-mouth referrals. Slightly more than half of the participants in the EDD Retraining program element heard about the program from word-of-mouth sources or through their trade organization. As expected, trade organizations and unions were by far the most common way that the participants from the ETP Career Advancement program element were made aware of the program.

Figure 8: Sources of Program Awareness

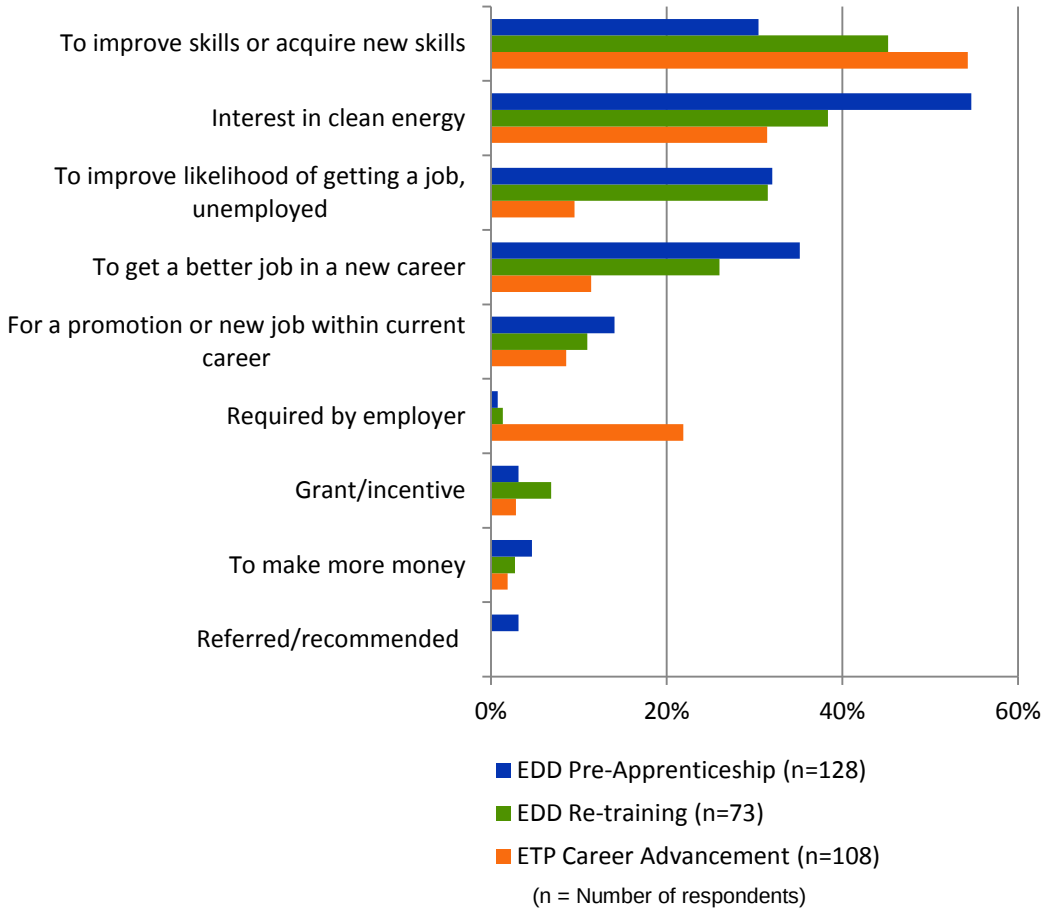


Source: DNV KEMA

What Were the Drivers of Participation?

Participants were asked to indicate the reasons they decided to enroll in the various program elements. Responses revealed a wide range of motivations, as shown in Figure 9. Slightly more than one-half of the participants in the EDD Pre-Apprenticeship program element chose to attend the training because of an interest in clean energy, while about one-third of EDD Retraining and one-third of the participants from the ETP Career Advancement program element reported this same motivation. Another common motivation across all participant groups was the desire to improve skills or acquire new skills. Roughly one-third of participants from the EDD Pre-Apprenticeship and Retraining program elements stated that they attended training to improve the likelihood of getting a job; a much smaller percentage of participants from the ETP Career Advancement program element (10 percent) stated this as a reason. As expected, almost one-quarter of the participants from the ETP Career Advancement program element were required to attend the training by their employer.

Figure 9: Drivers of Participation



Source: DNV KEMA

Were There Any Barriers to Completing the Training?

Participants were also asked about whether there were any barriers or challenges to participating in the training programs. As shown in Table 45, the challenge most commonly acknowledged by participants from all three program elements was time or schedule constraints. The time of day the training was offered and transportation were other barriers or challenges recognized by participants. The participants in the EDD Retraining program element reported challenges such as the need for dependent care, financial hardships, and difficulties with the hands-on training elements, more often than participants from the other two groups.

Table 45: Barriers or Challenges to Participating in Training Program

Participation Barrier/Challenge	EDD Pre-apprenticeship	EDD Retraining	ETP Career Advancement
Time constraints on my schedule	20%	14%	20%
Time of day the training was offered	15%	12%	7%
Transportation	14%	11%	6%
Care of dependents	7%	12%	6%
Course Fees and/or costs of materials	3%	11%	6%
Difficulties with hands-on training	5%	12%	0%
Language difficulties	3%	0%	1%
Number of respondents (n)	128	73	105

Source: DNV KEMA

Overall Impressions and Suggestions for Improvement

What Worked Well?

Participants were also asked an open-ended question about the aspects of training they felt worked well. As shown in Table 46, the most common attributes mentioned were the benefits of hands-on training, the effectiveness of instructors, and the usefulness of the information.

Table 46: Positive Attributes of Training Program

Attributes That Worked Well	EDD Pre-apprenticeship	EDD Retraining	ETP Career Advancement
Hands-on training	38%	29%	29%
Effective instructors	28%	37%	20%
Useful information	21%	22%	26%
Class discussions	8%	5%	6%
Materials used	3%	2%	11%
Number of respondents (n)	119	65	97

Source: DNV KEMA

What Could Be Improved?

Finally, participants were offered some suggestions for how the training could be improved. As shown in Table 47, the most common suggestion mentioned across the three program elements was to include more hands-on training. Respondents from the EDD program elements also mentioned a desire for more emphasis on job placement. A number of respondents suggested extending the course length, expanding the topics, or providing more in-depth instruction.

Table 47: Suggestions for Improvement

Suggestion for Improvement	EDD Pre-apprenticeship	EDD Retraining	ETP Career Advancement
More hands-on training	25%	15%	19%
Emphasis on job placement	15%	15%	2%
Extend course length	12%	11%	9%
Expand topics/more in-depth instruction	12%	6%	14%
Improved student screening	7%	6%	2%
More experienced instructors	5%	6%	6%
Improve materials	3%	8%	10%
Number of respondents (n)	119	65	97

Source: DNV KEMA

CHAPTER 8:
Conclusions and Recommendations

CEWTP was designed to leverage and advance the structure of California's existing training framework to address demand for trained workers in the clean energy industry. The primary objectives were to:

- Close the talent gap for clean energy jobs by building capacity for clean energy training in the state.
- Use sector strategies to create a well-planned workforce training effort through partnerships.
- Establish standardized, certified training in the clean energy sector.
- Create career pathways for the growing clean energy sector.

Overall, the results of this evaluation indicate that the specific training activities included within the design of the CEWTP program elements more than adequately took into account the needs of the local labor markets. The use of sector strategies effectively engaged local clean energy workforce advisory groups and potential employers during the planning stages of the program to ensure that the training provided would meet the needs of the local labor market. In addition to meeting industry and employer needs, CEWTP was designed to further trainees on their career paths. The use of standardized certifications increased the likelihood of sustained participation of trainees in the clean energy industry. CEWTP training activities were directly linked to the attainment of more than 3,500 industry-recognized certifications.

Conclusions

A detailed discussion of the key conclusions drawn from the evaluation is presented in this section, organized around the following topics or themes:

- Did the program build capacity for clean energy training to meet the needs and characteristics of California's labor market?
  - How well were the training activities aligned with local labor market needs?
  - Did the program make effective use of the sector strategy approach?
  - Did it target groups expected to require clean energy training?
  - Did it incorporate relevant training content?
  - Did it provide opportunities for standardized, certified training and create clear pathways?
- Did the program achieve its goals in terms of targeted number of individuals enrolled in and completing training, number of certifications obtained, and the number of jobs placed and retained?
- How did changes in the underlying labor market affect the program's effect on job placement?

- Was the program effective in terms of recruitment and retention, and what were some of the key features of its success in terms of marketing, screening, and providing supportive services?
- How effectively did the program adapt, as training and workforce goals were re-assessed? Was the program able to maintain relevance to current labor market needs and maximize the effectiveness of the training offered?
- Was the training delivered effectively? Did it include an appropriate balance of private and public instruction? Did it effectively leverage existing infrastructure, while at the same time allow for flexibility and innovation?
- How were instructors selected, and what qualities made them most effective?
- Did the short-term nature of the ARRA funding influence the effectiveness of program implementation?
- Were the program's administrative, financial, and reporting requirements reasonable or overly burdensome?
- Will the effects of the program sustain beyond the ARRA funding period?

Building Capacity and Meeting Needs of California's Labor Market

This section addresses how well the program performed in terms of building capacity for clean energy training to meet the needs and characteristics of California's labor market. It provides evaluation results indicating how well the training activities aligned with local labor market needs, and whether the program made effective use of the sector strategy approach. It also assesses the program's effectiveness to target groups that were expected to require clean energy training, whether it incorporated relevant training content. Finally, the program assesses if opportunities were provided for standardized, certified training, leading to the creation of career pathways.

Using Sector Approach to Ensure Alignment with Local Labor Market Needs

The program used a sector approach to ensure that the training activities were aligned with the needs of the local labor market. Sector strategies leveraged partnerships between employers, training providers, labor organizations, and other stakeholders to identify workforce needs within an industry sector in a geographic region and develop training plans relevant to those needs.

Sector strategies were used to engage local clean energy workforce advisory groups and potential employers during the planning stages of the program to ensure that the training provided would meet the needs of the local labor market. For example, collaboration with local WIBs helped ensure there were connections between the local workforce and employers, as well as the use of existing services for trainee screening, recruiting, instructor hiring, and curriculum design.

In addition, advisory councils were formed of industry partners, such as local employers, trade unions, industry nonprofits organizations, utility representatives, representatives from local WIBs, and private and public training providers. Advisory councils helped design training

curriculum, taking into consideration best practices, employer needs, hiring requirements, prerequisite skills and certification needs, daily work requirements, and upcoming programs or projects.

Using a sector approach helped focus EDD subgrantees and ETP subcontractors on the anticipated needs of the local labor market. Working with local employers and workforce development organizations was essential to developing realistic, localized projections of clean energy labor requirements for a given region. In addition, identifying specific, large-scale projects – such as utility-scale renewable energy projects – was an effective strategy and helped justify several training program investments.

The evaluation results indicate that the sector strategies employed by EDD subgrantees and ETP subcontractors effectively leveraged partnerships between employers, training providers, labor organizations, and other stakeholders to identify workforce needs within an industry sector in a geographic region, and develop training plans relevant to those needs.

In addition, EDD subgrantees fulfilled their requirements to establish regional partnerships with local training organizations, public/private employers, community and business development organizations, labor organizations, and other key stakeholders to ensure local needs were appropriately addressed in the training activities proposed and implemented.

Similarly, ETP subcontractors represented collaborative efforts between local employers and training providers. Although few ETP subcontractors developed a formal advisory council, employer input to curriculum design was a critical element of the program design.

Targeting Specific Types of Workers Expected to Require Clean Energy Training

The design and implementation of the CEWTP included efforts to target specific types of workers who were expected to require training on clean energy industry topics and skills. Targeted workers were identified within three dimensions or groups: employment status, trade groups, and underrepresented groups.

Employment Status

In recognition of high rates of unemployment within the construction, mechanical, and electrical trades, training activities were designed to anticipate the need for training and retraining these types of workers. EDD subgrantees specifically targeted unemployed and underemployed workforce segments within the Pre-apprenticeship and Retraining program elements. The goals of the ETP subcontracts were somewhat different in terms of the types of workers targeted and recruited for training. These subcontractors were more focused on targeting and recruiting incumbent workers as well as new hires.

Participant surveys confirmed the targeted employment groups for each training component. For example, the majority of ETP training participants reported being (currently) employed at the time of the training participant survey, which is expected, given that the ETP Career Advancement program element was targeted at incumbent workers or new hires. Only about half of the participants from the EDD Pre-Apprenticeship and Retraining program elements

reported being (currently) employed at the time of the survey, which confirms that EDD subgrantees were more likely to have targeted unemployed workers.

Similarly, participants reported during the telephone survey that they had been employed at their current jobs for periods that are consistent with the different training program targets. The majority of participants in the ETP Career Advancement program element reported being employed in their current position since they began the training. Overall, the participants from the ETP Career Advancement program element reported being employed in their (current) job for five or more years. This compares to only a small fraction of EDD training participants who reported being employed in their current position since training, and, in fact, the majority has only been employed at their (current) job for less than one year.

Finally, participants also reported being employed at levels or positions that were consistent with how the programs were targeted. For example, EDD Pre-Apprenticeship training participants were more likely to report having entry-level or apprentice-level positions, while ETP training participants were more likely to report having mid- or upper-level positions.

Trade Groups

Significant training needs were projected for workers within specific trades, such as construction, electrical, and plumbing. CEWTP activities, especially the EDD Pre-Apprenticeship and Retraining program elements, were designed to target workers within these trade groups. Many ETP subcontractors were also directly engaged within the construction and electrical trades.

Underrepresented Groups

Several specific demographic groups were known to be underrepresented in the clean energy workforce (for example, females, younger workers, less educated workers, and so on).[54] CEWTP activities were designed to target and address the specific needs of these underrepresented groups. For example, the EDD Pre-Apprenticeship program element encouraged subgrantees to target workers less than 25 years of age, veterans, chronically unemployed, workers from low-income households, and those with less than a high school diploma.

Incorporating Relevant Training Content

Another step to ensuring that the program was contributing toward the goal of building capacity within the clean energy industry workforce included verifying that it incorporated relevant and appropriate training content. This verification includes an assessment of the specific topics and end-use technologies addressed by the training curricula, as well as whether training was offered to improve other employment-related skills.

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54 California Workforce Education & Training Needs Assessment for Energy Efficiency, Distributed Generation, and Demand Response (2011), Institute for Research on Labor and Employment, University of California, Berkeley.

Topics Addressed by Training

Almost all the Green Building subgrantees included training that covered design and analysis, installation, and building energy audit topics, and the majority covered safety, health, and maintenance of systems. Some subgrantees designed training activities to address building inspections, while others included activities addressing building commissioning and building code compliance. Clean Energy subgrantees focused on the installation and maintenance of renewable energy systems and included training pertaining to safety or health issues related to working with these systems. Finally, the Career Advancement subcontractors addressed specific topics pertinent to specific employment needs.

These results line-up with training participant responses to the telephone survey. Participants confirmed that they had training on a wide range of topics consistent with the needs of the labor market. More than two-thirds of EDD Pre-Apprenticeship training participants were instructed on topics related to energy efficiency or solar technologies, and about one-half received training on construction, equipment installation, or weatherization practices. The majority of participants from the EDD Retraining program elements received training covering energy efficiency and/or construction industry topics, followed by solar technologies and building codes. A little more than half of the participants from ETP Career Advancement reported having attended training on solar technologies, and one-third participated in training that addressed energy efficiency and/or equipment installation.

In addition, training participants confirmed during the telephone survey that the topics in which they were trained directly related to their current job, providing further evidence of effective design and capacity building.

End Uses Addressed by Training

To address the need for workers skilled in HVAC, lighting, insulation, roofing, solar technologies, and building performance services, the majority of the EDD subgrantees addressed topics relevant to these technologies. The Career Advancement training was designed to address end uses that were most relevant to the immediate employment opportunities of their incumbent workers or new hire trainees. As such, end uses addressed in training varied across ETP subcontractors, but almost all provided training in heating and building envelope technologies.

Employment-Related Skills

Training activities were also designed to address more general topics with the goal of developing the basic skills needed to obtain and keep a job. These training activities focused on basic skills, such as math, reading, and writing, and vocational English as a Second Language; “soft” skills, such as verbal communication, accountability, ethics, and professionalism; and other basic computer and mechanical skills. Nearly all Pre-Apprenticeship subgrantees provided training in basic and “soft” skills, and half of the subgrantees offered computer and mechanical training. Retraining subgrantees were not required to offer training to address these areas, but about two-thirds offered training to address basic skills, “soft” skills, and mechanical skills. Similarly, Career Advancement subcontractors were not required to address these more

general topics, but 5 of the 13 subcontractors included training in computer skills, 3 subcontractors included basic skills training, 2 subcontractors included mechanical skills, and 1 subcontractor addressed "soft" skills.

Creating Career Pathways

CEWTP training activities were not only designed and implemented to meet industry and employer needs, but they succeeded in furthering trainees on their career paths. Training participant survey results confirm that CEWTP offered an entry point and/or supported growth along a participant's chosen career path.

In addition, most participants from both EDD and ETP agreed that the training they received had motivated them to continue to work in a field related to clean energy, that the training motivated them to consider additional training in clean energy, and that the training created more opportunities for career advancement. Participants also agreed, to a lesser extent, that the training increased the likelihood of their keeping their job. Finally, participants also expressed agreement that their career had advanced – or will advance – because of the training, further suggesting the value they have placed on their experience.

Providing Opportunities for Standardized, Certified Training

CEWTP also offered standardized, certified training in the clean energy sector, further supporting training participants' journeys along their chosen career path. Certifications not only contributed to the sustained participation of trainees in the clean energy industry, but they aided recruitment, retention, and job placement efforts.

While the relatively short term of the program limited the types of degrees or credentials that could be earned by training participants, certification training was offered by all EDD subgrantees and by nearly all (11 of 13) ETP subcontractors. Example certifications addressed by the various training activities include:

- Home Energy Rating System certification (through HERS, CalCERTS, et al).
- Certified green building professional (Build It Green).
- Building analyst professional, envelope professional, and building performance contractor (Building Performance Institute).
- Heating and cooling professional (NATE).
- Sustainable development professional, certified energy auditor (AEE)

As discussed in more detail below, CEWTP training activities were directly linked to the attainment of more than 3,500 industry-recognized certifications. Other ARRA-funded programs, such as the CCRR Program, required contractors attain certifications such those available through BPI and required surveyors and auditors to be certified HERS II raters. This alignment across and within Energy Commission programs helped ensure that the knowledge and skills acquired during training would be required in the clean energy workforce.

Achieving Program Goals and Targets

This section addresses how well the program achieved its goals in terms of the targeted number of individuals to be enrolled in and complete training, the number of certifications to be obtained, and the number of jobs placed and retained.

As shown in Table 48, more than 9,200 individuals enrolled in at least one of the CEWTP training activities (116 percent of goal), and about 7,400 individuals completed at least one of the training activities in which they were enrolled (101 percent of goal). For the most part, these accomplishments exceeded the specific targets established by the EDD subgrantees and ETP subcontractors for their respective programs.

In addition, the EDD Pre-Apprenticeship and Retraining program elements included specific targets for the number of certifications to be obtained by individuals who had completed training activities within the Pre-Apprenticeship and Retraining program elements. As shown in Table 49, more than 3,500 industry-recognized certifications were obtained, which for the most part was in line with the program targets. This also represents about 84 percent of the more than 4,200 individuals who completed training through one of the EDD subprograms.

Another goal of the EDD training activities was to achieve certain employment placement targets. As shown in Table 50, about 1,900 participants were placed in unsubsidized jobs, and about 1,100 were placed in training-related jobs.

The evaluation identified a number of reasons for the lower-than-expected demand for trained workers, including:

- **Lagging economy and high unemployment –** The economy was cited as a prime reason for the lack of jobs, specifically the construction industry lagging due to the economic downturn.
- **Cancelling of key federal programs –** Federal programs such as PACE never kicked off, resulting in significantly fewer jobs than anticipated.
- **Lack of supportive legislation –** Legislation expected to support the green economy did not materialize and, as a result, businesses were reluctant to expand and homeowners lacked incentives to invest in energy efficiency.
- **Uncertainty in clean energy markets –** Uncertainty with regard to regulatory processes and utility rebate program incentives were cited as factors leading to slower-than-expected installations of both utility-scale and customer-sited clean energy projects.

These factors combined to cause reductions in the demand for trained workers as compared to what was anticipated when the CEWTP was being initiated. That said, about 45 percent of all EDD training participants were placed in unsubsidized, jobs and about one-quarter were placed in training-related jobs. This equates to placing roughly one of every two individuals who completed training in unsubsidized jobs and placing about one of every four individuals in training-related jobs.

Table 48: Summary of CEWTP Enrollment and Completed Training Goals and Accomplishments

Admin-istrator	Program Element (Number of Subgrantees or Subcontractors)		Number of Trainees Enrolled (Goal)	Number of Trainees Enrolled (Achieved)	Percent of Trainees Enrolled (Achieved ÷ Goal)	Number of Trainees Completed (Goal)	Number of Trainees Completed (Achieved)	Percent of Trainees Completed (Achieved÷ Goal)
EDD[1]	Pre-Appren-ticeship	Green Building (16)	2,505	2,555	102%	2,233	2,301	103%
		Clean Energy (2)	270	294	109%	236	278	118%
		Pre-Apprenticeship Total (18)	2,775	2,849	103%	2,469	2,579	104%
	Re-training	Green Building (9)	1,562	1,666	107%	1,280	1,403	110%
		Clean Energy (1)	260	232	89%	234	228	97%
		Retraining Total (10)	1,822	1,898	104%	1,514	1,631	108%
	OJT (4)		143	78	55%	143	62[2]	43%
	EDD Total (32)		4,740	4,825	102%	4,126	4,272	104%
ETP[3]	Career Advancement (13)		3,255	4,422	136%	3,255	3,166	97%
Clean Energy Workforce Training Program (45)			**7,995**	**9,247**	**116%**	**7,381**	**7,438**	**101%**

[1] EDD data extracted from *Final Report for the California Clean Energy Workforce Training Program*, April 13, 2012, available from http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/CA_Clean_Energy_Wrkfc_Training_Program-Final_Report_2012-04-13.pdf (accessed 7/28/2013).

[2] Sixteen participants in the OJT component were transferred to another WIA funding source to continue training.

[3] ETP goals extracted from subcontracts, accomplishments extracted from the ETP Final Invoice determination, which was provided by ETP staff to the evaluators in April 2012.

Source: DNV KEMA

Table 49: Summary of EDD Certification Goals and Accomplishments

Program Element (Number of Subgrantees)		Number of Trainees Completed (Achieved)	Number of Certifications Attained (Goal)	Number of Certifications Attained (Achieved)	Percent of Certifications Attained (Achieved÷Goal)	Percent of Trainees Attaining Certifications (Achieved)
EDD Pre-Appren-ticeship[1]	Green Building (16)	2,301	1,640	1,528	93%	66%
	Clean Energy (2)	278	193	251	130%	90%
	Pre-Appren-ticeship Total (18)	2,579	1,833	1,779	97%	69%
EDD Re-training[1]	Green Building (9)	1,403	1,110	1,545	139%	110%
	Clean Energy (1)	228	234	228	97%	100%
	Retraining Total (10)	1,631	1,344	1,773	132%	109%
EDD Total (28)[1]		**4,210**	**3,177**	**3,552**	**112%**	**84%**

[1] EDD data extracted from *Final Report for the California Clean Energy Workforce Training Program*, April 13, 2012, available from http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/CA_Clean_Energy_Wrkfc_Training_Program-Final_Report_2012-04-13.pdf (accessed 7/28/2013).

Source: DNV KEMA

Table 50: Summary of EDD Employment Placement Goals and Accomplishments

Program Element (Number of Subgrantees)		Number of Trainees Completed (Achieved)	Number of Trainees Placed in Un-subsidized Jobs (Goal)	Number of Trainees Placed in Un-subsidized Jobs (Achieved)	Percent of Un-subsidized Jobs (Achieved÷ Goal)	Percent of Trainees Obtaining Un-subsidized Jobs (Achieved)	Number of Trainees Placed in Training-Related Jobs (Goal)	Number of Trainees Placed in Training-Related Jobs (Achieved)	Percent of Training-Related Jobs (Achieved÷ Goal)	Percent of Trainees Obtaining Training-Related Jobs (Achieved)
EDD Pre-Apprentice-ship[1]	Green Building (16)	2,301	1,763	1,050	60%	46%	940	698	74%	30%
	Clean Energy (2)	278	201	143	71%	51%	85	113	133%	41%
	Pre-Apprentice-ship Total (18)	2,579	1,964	1,193	61%	46%	1,025	811	79%	31%
EDD Re-training[1]	Green Building (9)	1,403	1,094	664	61%	47%	856	330	39%	24%
	Clean Energy (1)	228	217	32	15%	14%	N/A	N/A	N/A	N/A
	Retraining Total (10)	1,631	1,311	696	53%	43%	856	330	39%	20%
EDD Total (28)[1]		**4,210**	**3,275**	**1,889**	**58%**	**45%**	**1,881**	**1,141**	**61%**	**27%**

[1] EDD data extracted from *Final Report for the California Clean Energy Workforce Training Program*, April 13, 2012, available from http://www.energy.ca.gov/ab758/documents/ARRA-Programs/final_reports/CA_Clean_Energy_Wrkfc_Training_Program-Final_Report_2012-04-13.pdf (accessed 7/28/2013).

Source: DNV KEMA

By definition, the OJT component implemented by four EDD subgrantees was designed to provide training opportunities for trainees to gain direct job experience and increase their chances of obtaining permanent employment. Individuals who participated in the ETP Career Advancement program element were, by definition, required to be employed for a specified period following the training. As indicated above, 3,166 participants completed training through the ETP Career Advancement program element and were retained in employment positions for (at least) the contractually required minimum time frame. While new jobs may not have been created or attained for these participants, all of them received upgraded skills in the green building and clean energy sectors.

Results from the training participant surveys confirm that, of participants who were currently employed (at the time of the survey), most were employed in an energy-related field. While the occupational fields varied by program elements, more than one-quarter of the participants from the EDD Pre-Apprenticeship and Retraining program elements and a similar percentage of the participants from the ETP Career Advancement program element were employed within the general trades industry (for example, construction and plumbing). A significant percentage of the participants from the ETP Career Advancement program element also reported they were working in the electrician field.

The percentage of participants who indicated they were working in non-energy-related fields was highest among participants in the EDD Pre-Apprenticeship program element, followed by EDD Retraining, and then ETP Career Advancement. This trend appears to reflect differences in the ways in which the different training programs were designed – with the ETP Career Advancement program element focused on incumbent workers already employed in energy-related jobs, whereas the EDD Pre-Apprenticeship and Retraining program elements were targeted to new entrants, unemployed and underemployed, many of which have yet to transition into energy-related occupations.

Other key findings from the training participant survey that address to employment-related outcomes include:

- The majority of the participants from the EDD Pre-Apprenticeship and Retraining program elements reported applying for a new job since participating in the training program, compared to less than one-third (30 percent) of the participants from the ETP Career Advancement program element.
- Of participants who had applied for jobs, the majority had applied for jobs in field related to the clean energy industry. Half of the participants in the EDD Pre-Apprenticeship program element were seeking employment in solar sales or installation, whereas about one-third of the participants in the EDD Retraining program element were looking for jobs as building energy auditors. The participants from the ETP Career Advancement program element reported having applied for jobs in the solar field as electricians, or as energy laborers.

Program Recruitment and Retention Effectiveness

An effective recruitment and retention strategy for CEWTP depended on effective marketing, recruiting, screening, and accommodation of special circumstances. Several successful strategies employed by CEWTP implementers and their associated challenges are summarized below:

Marketing

Implementers used a multipronged marketing strategy, assisted by local workforce development agencies, which included strategically distributed printed materials (for example, press releases, flyers, and advertisements) and personal outreach (for example, e-mail blasts, phone calls, and forum presentations). Referrals were particularly helpful in that they typically drew from established, local workforce networks, connecting case managers to a pool of unemployed workers.

The training participant survey addressed how participants heard about the program. Since each program targeted different types of participants, it is understandable that participants reported hearing about the program from a variety of sources. One-third of participants in the EDD Pre-Apprenticeship program element, which targeted individuals with little to no work experience, heard about the training from the local career service center. Nearly another one-third of participants in the EDD Pre-Apprenticeship program element learned about the program from word-of-mouth referrals. Slightly more than half of the participants in the EDD Retraining program element heard about the program from word-of-mouth sources or through their trade organization. As expected, trade organizations and unions were by far the most common way that the participants from the ETP Career Advancement program element were made aware of the program.

In some areas, competition from existing training programs created marketing and recruitment challenges. For example, in some cases, it was hard to compete with highly subsidized training. In some areas, it was difficult to stand out, especially in crowded markets where contractors "shop around." Finally, in the case of ETP, there was at least the perception that these other programs were "easier" to choose when compared to the administrative (such as, eligibility and reporting) and financial (reimbursement process) requirements of CEWTP.

Recruiting

In the case of EDD, recruiting was largely facilitated by having a large pool of unemployed workers from which to recruit and coordination with local WIBs, one-stop centers, community colleges, and community-based organizations that provided a pipeline of eligible trainees, and tapped from their existing contacts with the local workforce. By contrast, some ETP subcontractors experienced recruitment challenges, which were related to – if not driven by – other challenges such as administrative and financial complexities (for example, employer certification requirements, initial outlay, and reimbursement requirements), competition from similar training programs, and the underlying and persistent weak demand for training across the state. Other recruitment challenges stemmed from changes in the level of employer commitment in the time between the proposal and program launch.

Screening

To maintain the high trainee retention rate within the EDD Pre-Apprenticeship and Retraining program elements, screening was effective in identifying individuals who were most likely to attend the course until completion. Screening procedures included assessments of basic math and language skills, mechanical aptitude, construction experience, and work history. Screening is also important, especially in tight labor markets where training programs cannot offer promise of employment. Screening is aided by training orientations that are effective at communicating expectations (both in terms of what the trainee would get from the program, and what was expected of the trainee to complete the program).

Employer screening was a more prevalent strategy for ETP, and attributes used to screen potential employers varied among subcontractors. (For example, some felt small businesses were a poor fit, while others had success working with small business employers.)

Trainee Retention

Once trainees had been placed into a program, it was a priority to help trainees stay with the program until completion. The most common challenge reported was that the difficulty level of the course exceeded trainee expectations (for example, course load, math requirements). Other challenges to trainee retention became apparent as the course term progressed. For example, some trainees stopped attending class once they received an OSHA certificate upon completing an introductory safety module.

Optimized training schedules also aid in retention and were effective when taking into account the current employment status of the trainee (for example, full-time, part-time, unemployed). For some candidates, especially those with more flexibility in their work/life balance, compressed schedules were more effective at reducing dropouts than longer-term options. Reducing the minimum training requirement from 24 to eight hours per trainee helped improve retention and allowed some flexibility for trainees who were only interested in certain areas.

Training participant surveys confirmed that one of the biggest barriers or challenges to participating in the training programs was time and schedule constraints.

Supportive Services

Providing various types of supportive services were also believed to be effective in reducing participation barriers and increasing trainee retention. EDD effectively coordinated with local WIBs and community colleges to provide supportive services (for example, books, daycare needs, meal vouchers, bus passes, and gas cards). These types of supportive services can make a big difference, especially for programs located in rural training areas, where transportation costs can be significant, unemployment rates are relatively high, and few alternative training options exist. Case management was also effective in keeping trainees engaged during (and often after) the training program.

Participant surveys confirm the value that these types of supportive services can provide in terms of removing barriers to participation. Participants mentioned travel time and

transportation costs, dependent care, and other financial hardships as challenges to participating in and completing the training program.

Program Adaptation Effectiveness

The ability of a program to adapt as training and workforce goals are reassessed is key to maintaining relevance to current labor market needs and to maximizing the effectiveness of the training offered. CEWTP was effective in this regard; however, several challenges limited some potential for making mid-course improvements in a timely manner.

Some subgrantees and subcontractors adapted their curricula to accommodate needs brought about by changes in relevant certifications. The changes were triggered by requests from potential employers, requests from trainees, or in response to changes in labor market conditions. The ability to make these changes to the program plan was important not only in terms of curriculum, but in terms of eligibility requirements. ETP subcontractors considered expanding the eligibility requirements of ETP to include independent contractors, sole proprietors, and government workers to be a critical success factor.

Another barrier to making modifications in a timely manner stemmed from a perceived lack of autonomy in the decision-making process. Other challenges centered on the downsides to dealing with state-driven changes to certifications, such as having to retake tests and relying on only one provider for important certifications.

Another important element of program adaptation addressed unexpected program costs. Not all subgrantees were able to offer supportive services through their local WIB. While in many ways CEWTP funding was effective in reducing the cost of training, there were other barriers that could have been reduced if there was more funding available to provide these types of supportive services.

Training Delivery Effectiveness

While subgrantees and subcontractors were responsible for administering the training provided under CEWTP, they were not necessarily the actual training providers. Training was also delivered by coordinating with local community colleges or contracting to one or many private training providers.

Overall, the evaluation found that CEWTP training was delivered effectively, reflecting an appropriate balance of private and public instruction, effectively leverage existing infrastructure, while at the same time allowing for participation from new training partners and organizations.

There are trade-offs between the value of public and private instruction. Some felt strongly that private instruction could offer more hands-on training, more experienced instructors, smaller classes, and better facilities to demonstrate different types of installations. On the other hand, private instruction is generally more expensive and, in some cases, creates monopolies in the market for certifications, which may unfairly influence pricing. Private instruction, regardless of whether it is (perceived as) better, is often the only option when few exist with the local area and/or the public sector.

In the context of ETP, large and established training programs demonstrated greater delivery success than small, start-up programs for a few reasons, such as readily available, preexisting curriculum and training infrastructure; experienced teaching staff on-hand; and long-standing relationships with industry partners.

Start-up programs are difficult to implement especially in a relatively short term, such as the 18-month start-up period for CEWTP. On the other hand, smaller, less established programs often provide the "seeds for innovation" that can eventually be adapted by larger, more traditional programs.

Nonprofit organizations were more likely to encounter administrative difficulties. In addition, in the case of ETP, nonprofit groups generally lack the initial cash outlay to launch programs without financial or extensive "in kind" supportive services.

The training participant surveys also addressed several aspects of training delivery effectiveness, most notably:

- Participants reported high levels of satisfaction with the training overall, the communication of topics, and relevancy to one's career path. The only element to have an average rating of less than a "4" was whether the material provided in the training was new to them.
- The most common positive attributes of the training programs included the benefits of hands-on training, the effectiveness of instructors, and the usefulness of the information.
- Improvements suggested including more hands-on training, more emphasis on job placement, extending the course length, expanding the topics, and providing more in-depth instruction.

Instructor Quality

Industry experience of instructors is critical in the effectiveness of CEWTP design and delivery. CEWTP instructors were gleaned from several industry sources, including trade unions, industry associations, equipment manufacturers, and local contractors. Having instructors who are actually part of the workforce helps ensure they are knowledgeable about the needed skills, especially in light of rapid changes in technology and complexities in evolving clean energy policy.

Training providers also valued an instructor's ability to communicate in a clear and compelling manner, using real-life examples and hands-on demonstrations.

Time Constraints

Due in part to the ARRA funding timetable, training programs had an expected schedule of 18 months from the time of approval to the end of the program. This influenced the time available to coordinate advisory councils, develop training curriculum (especially anything that was not leveraging pre-existing material), identify and retain qualified instructors, recruit training participants, and consider needed modifications in response to unanticipated circumstances (such as staff changes or labor market developments). In addition, in the case of ETP, the ARRA

funding timetable made it difficult to consider alternatives to employer eligibility and/or certification requirements and/or certification.

Reporting and Other Administrative Requirements

Some challenges were cited in terms of the program's reporting and other administrative requirements for subgrantees and subcontractors. Examples include possible conflicting/redundant reporting requirements, document standardization, and new tracking and reporting systems. In some cases, implementers may have underestimated the "slope of the learning curve" associated with the administrative requirements of the program.

Program Evaluability

While this evaluation was successful in assessing the effectiveness of the program in achieving its goals and its alignment with labor market needs, it was limited in terms of the types of information, documentation, and data available to support a more in-depth analysis of program performance. The following summarizes some of these key limitations.

- **Training Course Descriptions.** Detailed documentation regarding the actual training activities implemented by EDD subgrantees and ETP subcontractors was not available for the evaluation, limiting the types of analyses that could be completed as part of the scope of this study. For example, documentation on the types of topics covered in and the types of trainees attending the training activities was not consistently available, and, instead, evaluators were able only to characterize training activities based on what EDD subgrantees and ETP subcontractors planned to offer at an aggregated level across their full program. In addition, information on the frequency and duration of the training activities was not available and would have been useful. Finally, data on the number of trainees who completed each individual training activity (as opposed to the more generalized total number of trainees completing training) were not available.
- **Certifications Attained.** EDD subgrantees were required to enter the number attaining certifications into the WIA JTA system. Some EDD subgrantees reported the total number of certifications or degrees attained by trainees, as opposed to other subgrantees who reported the total number of trainees who attained certifications. In addition, information on the specific types of certifications attained was not tracked, along with the counts of how many were attained (or more importantly, how many were attained by each trainee), nor were the certifications attained linked to having attended specific training courses covering relevant topics. ETP subcontractors were not required to track certifications attained by trainees.
- **Program Expenditure Documentation.** Final expenditures data or documentation for each EDD subgrantee was not provided to the evaluators as part of this study; instead, EDD provide the final expenditures for the total program only. This information was made available by ETP for the total program, as well as for each ETP subcontractor. Additional detail on funding levels for different types of activities, such as training program planning and development, recruitment and retention services, instruction (including hands-on and on-the-job activities), employment and career referral services,

and administration and reporting activities, would have been helpful in evaluating the effectiveness of different activities and approaches across different implementers.

- **Tracking and Reporting.** As mentioned above, EDD subgrantees and ETP subcontractors expressed concerns regarding the program's reporting requirements. Evaluators share these concerns in that the reporting documents made available for this study were neither consistently reported nor complete for all the EDD subgrantees. In addition, the information contained in the close-out reports EDD subgrantees required by WIA funding frequently differed significantly from the data captured in the WIA's required JTA reporting system; attempts to reconcile these two data sources were time consuming and, ultimately, unsuccessful. In general, data were more accurately and consistently reported by ETP subcontractors because the ETP Career Advancement Program included performance metrics as part of its design and implementation approach.
- **Employer Linkages.** Very little information was consistently available to document the linkages between training programs and employer outreach and job placement activities. At a minimum, evaluators expected better documentation related to the employer and/or employment agencies that were engaged in the sector strategies and planning activities. Information about the types of employers/occupations would also have been useful in characterizing the alignment between training topics offered and labor market needs.
- **Trainee Characteristics Data.** While the evaluation team understands there are valid concerns regarding maintaining training participant privacy and confidentiality, the general absence of trainee-specific data limited the type and (potentially) representativeness of data collected and analyzed as part of this evaluation. Specific trainee survey questions could not be tailored to training activities because (as mentioned above) the evaluation team lacked information about the individual training courses that were actually offered. The team also lacked information about which trainees attended which courses. In addition, evaluators were unable to determine whether and how representative the trainee survey results were of the full CEWTP population because consistent information was not made available for all trainees and for all courses. Ultimately, privacy and confidentiality concerns should not preclude the tracking of detailed information on trainees; evaluators can analyze the characteristics of trainees using redacted databases and reporting structures.
- **Trainee Contact Information.** Again, while understandable given concerns regarding privacy and confidentiality, trainee contact information (including name and preferred method of contact, such as personal phone, business phone and/or e-mail) was not made available for all trainees as part of this study. In some cases, trainees were not asked to sign release forms allowing the sharing of this information for evaluation purposes; in other cases, complete and consistent trainee contact information may not have been tracked in such a way that it could be extracted and used for evaluation.

Program Sustainability

The Energy Commission implemented CEWTP with the hope that it would ensure the continued viability and sustainability of workforce development functions beyond the expiration of ARRA. The collaborative bonds formed among educational institutions, industry advisory councils, and local workforce agencies were critical in sustaining clean energy training into the future.

Subgrantees and subcontractors indicate that there is potential for the effects of CEWTP to sustain beyond the ARRA period in that they have since incorporated clean energy workforce training into standard training curricula.

In some cases, fee-based schedules for clean energy training are available, representative sustainable sources of funding, such as a "franchise model" (similar to the design of the ETP Career Advancement program element), in which employers are provided the resources necessary to enable them to train their own employees. Another example is the establishment of a sustainable funding framework drawing on nonprofit organizations and charitable contributions.

Additional evidence of possible sustainable impacts stems from the fact that implementers have submitted applications for and/or expect to receive funding through public sources, such as educational institutions and state agencies (for example, Department of Rehabilitation and Department of Labor.

Even under the best labor market and economic conditions, sustainability is often the most challenging goal for new and developing programs. Yet, subgrantees and subcontractors were optimistic that clean energy training programs would continue beyond the ARRA period.

Recommendations

Workforce education and training will continue to be a key element of California's *Long Term Energy Efficiency Strategic Plan.* Created in 2008, California's *Long Term Energy Efficiency Strategic Plan* identified workforce education and training as essential to the successful implementation of energy efficiency programs so that savings goals are achieved. In recognizing that many other entities in the state are involved in workforce education and training, the California Public Utilities Commission highlighted the need for collaboration among state agencies, educational institutions, community-based and nonprofit organizations, private industry, and labor to create a comprehensive and coordinated statewide Workforce Education and Training Program for a new, energy-efficient economy. As such, the Energy Commission should continue to participate in statewide, collaborative efforts to support the development of sustainable and high-quality clean energy training program, building on the successes and lessons learned from the CEWTP experience.

Policy and legislative support for the activities and programs that utilize these trained workers will also be required to sustain the success of ARRA-funded clean energy workforce education

and training. Public resources should continue to be allocated in support of clean energy workforce education and training programs, and program implementers should be required to address the extent to which they address workforce education and training needs. Further, publicly funded energy efficiency programs should consider including clean energy certifications and skill standards as part of their program requirements.

The following is a detailed summary of key recommendations from the evaluation of CEWTP organized according to the key themes and trends discussed above.

Collaborative Efforts to Ensure Program Design Effectiveness

- Future programs should use similar sector strategies to ensure training activities meet the needs of the local labor market. This will ensure local input from local workforce advisory groups and potential employers, as well as the use of established training program supportive services (for example, screening, recruiting, instructor hiring, and curriculum design).
- Some portion of public funds should be allocated to clean energy industry job training programs conducted by community colleges, workforce investment boards, employers, trade associations, and unions.
- Advisory groups should continue to include a range of industry and academic partners, such as local employers, trade unions, industry nonprofit organizations, utility representatives, representatives from local WIBs, and private and public training providers.
- Involve employers from the "beginning to end" (curriculum design to job placement services).
- To increase the direct effect of training programs at a local level, design training curriculum to fit the needs of specific, large-scale clean energy projects. This type of strategy provides credible justification for training investments and links outcomes to job creation.

Training Characteristics

Certifications

- Certifications aid in recruitment, retention, and job placement and have a direct linkage to sustained participation of trainees in the clean energy industry. As such, continue efforts to include training for the most useful and influential clean energy industry certifications.
- Maintain alignment between training activities and certification requirements of other energy efficiency programs, including those implemented by the Energy Commission as well as other implementers statewide.
- Design programs to allow sufficient flexibility to adapt to changes in standards and certifications over time.

- Focus on standardized training from credentialed programs that result in consistency of knowledge, skills, and experience for trainees.

Career Path

- Continue to design training programs to address participants' desires to have "a career" in clean energy. This provides greater motivation not only to remain within the clean energy industry once the training is completed, but will encourage participants to seek ongoing training over time to stay current and continue to advance within this rapidly evolving field.

Skills Development

- Include basic and ancillary skills training – alongside or in parallel to technical skills training – in future program designs. These types of "soft" skills, including a broad array of foundational and interpersonal skills, are required to find and keep any type of job, let alone develop a career.
- In addition, consider offering advanced training in sales, marketing, and financing, especially in future employer-directed programs.

Hands-On Training

- Incorporate various types of hands-on training into future program designs.
- Maintaining an appropriate balance between theoretical knowledge and practical experience will also be important.
- Hands-on training should include specific instruction on interpersonal and attitudinal characteristics (for example, ability to learn and take direction), as well as technical characteristics.

Employer Outreach and Job Placement

- Continue to use WIBs' other workforce partners and job placement services of the community colleges to ensure effective leveraging of established employer networks and job search resources. Consider earmarking a portion of training program funds to create dedicated job lead development positions within partner organizations.
- Employment and career referral services should be an essential part of future program designs. Design these services to encourage training participants to seek employment within the clean energy field, even if jobs in their chosen path (for example, solar energy) are not available at the time they are looking for a job. Ensure trainees are following through on referral services.
- Continue to rely on feedback from employers who actively hire from the "labor pool" generated from future training activities. This aligns programs with labor market needs and helps turn out "hirable" employment candidates.

- Encourage program staff and instructors to be proactive about recommending employment candidates.
- Aspire to have training programs regarded by employers as their "go to" source for new employees.
- Seek affiliation with energy policy-driven programs, such as energy efficiency retrofits for residential and commercial buildings, to place trainees in jobs these programs create.

"Other" Employer Needs and Requirements

- Future programs should include training to meet employer needs and satisfy employer requirements that are not often easy to detect during screening and interview processes. This includes coaching on "willingness to learn" and "ability to follow directions," as well as basic employment-related skills, such as punctuality, safety considerations, and an ability to work efficiently.
- Provide instruction to ensure trainees have developed interpersonal and communication skills appropriate for their chosen career path.

Effectiveness of Trainee Recruitment and Retention

Marketing

- Incorporate multipronged marketing strategies into future marketing plans. Strategically use printed materials and maximize the use of referrals for personal outreach.
- Leverage marketing, outreach, and recruitment services available through partnerships developed by sector strategies.
- Design future training programs to emphasize key elements that participants highly value, including hands-on training, quality instructors, job placement services, and varying levels of content (basic to advanced).
- Promote training as an effective employee utilization strategy during unexpected downturns.
- Coordination, rather than competition, should be the goal in areas where training program choices are plentiful. Strike a balance between leveraging and enhancing established training networks in areas where large pools of trained workers are in high demand, ensuring adequate resources are available to serve areas where limited training options already exist (yet employment demand may be low or lumpy).
- Training programs should continue to be designed to fit the needs of different groups of participants taking into account current employment levels, as well as career path aspirations. As such, efforts to target candidates with the appropriate level of skills, capabilities, and work experience should continue to be a critical part of marketing and outreach, screening, and recruitment activities.

Recruiting

- Continue to rely heavily on the established recruitment services within the local WIBs, one-stop centers, community colleges, and community-based organizations to identify trainee "pipelines."
- Consider alternative eligibility requirements that would allow for a broader base from which to recruit employers to participate in training programs.
- Consider the trade-off between performance-based contracts for employer-driven training programs and more financially competitive options.

Screening

- Effective screening of trainee candidates should include assessment of basic skills, aptitude, and experience, as well as clear communication of expectations from and for training program participation.
- Future employer-driven programs should screen on a wider range of attributes to increase participation rates and improve program flexibility.

Trainee Retention

- Consider requiring completion of the full training course prior issuing certifications.
- Optimize training schedules by including regular, but flexible options to account for differences in trainee work/life requirements.
- Continue to offer lowered minimum requirements (eight hours per trainee), especially for those interested in training only in certain areas.

Supportive Services

- Continue to leverage existing channels for providing supportive services to help reduce financial hardship experienced by training participants, especially but not necessarily limited to rural training areas.
- Consider earmarking a portion of training program budgets for providing supportive services (including financial stipends) – where none otherwise exist, or in areas where recruitment and/or retention challenges are significant.
- Future training programs will need to offer flexible, yet regular training schedules, as well as provide important financial supportive services (for example, transportation stipends, and subsidized daycare) to encourage high levels of participation.

Program Adaptation and Relevancy

- Continue to research and identify effective strategies for accommodating mid-stream changes to key program design and implementation features such as curriculum, employer eligibility requirements, and state-driven changes in certifications. These

strategies need to be flexible enough to allow for implementation within a reasonable time frame, while at the same time ensuring quality and control over training outcomes.

Training Delivery

- Continue to offer a mix of training program delivery options, including private instruction, where comparable alternatives do not exist within the public sector.
- Leverage larger, established training programs to take advantage of existing infrastructure, resources, and industry relationships.
- Look to the private sector and/or smaller, less traditional training providers to provide the "seeds for innovation."
- Consideration should be given to the upfront planning time needed to launch start-up programs, as well as the time required to introduce new material and techniques into established programs.
- Offer adequate compensation to cover administrative requirements when smaller firms and/or nonprofit organizations are engaged in training program delivery.
- Training programs should continue to strike the balance between providing content that is foundational, as well as "new.".
- To maintain high levels of satisfaction, participants need to understand the material presented, they need to feel it is appropriate for their level of need, and it needs to be relevant to their chosen career path.

Instructor Quality

- Continue to identify and attract high-quality instructors to ensure effective training program design and delivery.
- Evaluate instructor performance against industry benchmarks (for example, communications, content, format, and so on).
- Hire instructors with current industry-related work experience.

Time Constraints

- Plan future programs against a longer time horizon, and develop a road map that outlines a process for making mid-course assessments and modifications, as necessary.

Coordination

- Continue to emphasize and support the critical relationship among community colleges, the local WIB, and industry partners to streamline program delivery and widen the scope of outreach.
- Address coordination challenges, such as financial and programmatic barriers that impede the creation and maintenance of efficient partnerships among these important groups.

Reporting and Other Administrative Requirements

- Provide adequate training and technical assistance to overcome some of the coordination and implementation barriers centered on program reporting and other administrative requirements.

Program Evaluability

- Document and provide to evaluators detailed information regarding the actual training activities implemented, including the types of topics covered in and the types of trainees attending the individual training activities, the frequency and duration of the training activities, and the number of trainees who completed each training activity.
- Report more detailed certification information, including the specific types of certifications attained, counts of how many were attained, multiple certifications attained by individual trainees, and linkages to attendance records for training courses covering relevant topics. Consider creating certification clusters or groups that correspond to different clean energy pathways and then require implementers to report trainee progress within different groups.
- Require more complete and consistent reporting of program expenditure data to facilitate an assessment of incremental value-add (that is, effectiveness of Energy Commission funded activities over-and-above what would have been funded through other workforce education and training funding sources).
- Coordinate and/or reconcile program tracking and reporting requirements across multiple agencies (such as WIB, EDD, ETP, Energy Commission) to improve accuracy and consistency across all relevant reporting systems.
- Provide more detailed and complete information related to the employer and/or employment agencies engaged in training development and planning activities, as well as information specific to the types of employers/occupations engaged in outreach and job placement activities.
- Provide redacted information to facilitate analysis of each training course and the types of trainees attending each activity.
- Investigate the relevant privacy and confidentiality constraints to making trainee contact information available for evaluation purposes; if release forms are required, consider adding this as an implementation requirement; alternatively, evaluators could request that trainees sign release forms, but this is less efficient and potentially biased if not implemented randomly across the full program.

CHAPTER 9:
Glossary

ACS	**American Community Survey**
AEE	Association of Energy Engineers
AFL-CIO	American Federation of Labor and Congress of Industrial Organizations
ARRA	American Recovery and Reinvestment Act of 2009
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BPI	Building Performance Institute
CalCERTS	California Certified Energy Rating and Testing Services, a private organization that provides service, support, training and certifications for HERS raters
CATI	Computer-Aided Telephone Interview
CBPCA	California Building Performance Contractors Association
CCD	Community College District
CCRR	California Comprehensive Residential Retrofit
CEWTP	Clean Energy Workforce Training Program
CPUC	California Public Utilities Commission
CWIB	California Workforce Investment Board
DNV KEMA	DNV KEMA Energy & Sustainability
DOL	Department of Labor
DSM	demand-side management
EDD	Employment Development Department
Energy Commission	California Energy Commission
ETP	Employment Training Panel
FERPA	Family Educational Rights and Privacy Act
GED	General Education Development test
HERS	Home Energy Rating System
HS	high school
HVAC	heating, ventilation, and air conditioning
IEPR	Integrated Energy Policy Report
IOU	Investor-owned utility

JTA	Job Training Automation
IECC	International Energy Conservation Code
LEED	Leadership in Energy and Environmental Design
LMC	Low/moderate limited clientele
MCR	Municipal and Commercial Building Targeted Retrofit Program
N/A	Not available
NABCEP	North American Board of Certified Energy Practitioners
NATE	North American Technician Excellence
OJT	On-the-job training
OSHA	Occupational Safety and Health Administration
PACE	Property Assessed Clean Energy
PG&E	Pacific Gas and Electric Company
POU	Publicly Owned Utility
PV	photovoltaic
SCE	Southern California Edison
SDG&E	San Diego Gas & Electric
SEP	State Energy Program
SFP	solicitation for proposal
SoCal Gas	Southern California Gas Company
Title 20	California Code of Regulations, Title 20, Public Utilities and Energy
Title 24	California Code of Regulations, Title 24, also known as the California Building Standards Code
U.S. DOE	(United States) Department of Energy
WE&T	workforce education and training
WIA	Workforce Investment Act
WIB	workforce investment board

Appendices

Appendix A: List of Stakeholders Engaged in Training Program Partnerships

Appendix B: Data Collection Instruments

Appendix C: CEWTP Trainee Survey Results

These appendices are available in a single separate volume:

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